

# THE IRON AGE

*Seventy-fifth Year*

OCTOBER 2, 1930

West Virginia Geological Survey  
Morgantown, W. Va.



SPECIAL  
STEELS

## THE RESULT

of a quarter century of successful metallurgical research and practical development toward analyses combining—

- (1) Excellent Physical Properties
- (2) Free Machining Qualities

IMMEDIATE  
DELIVERY

Carbons	.10 — 1.00
Sizes	$\frac{1}{4}$ " — 10"

"Pertinent Points" bulletins  
contain the facts  
Write for them.

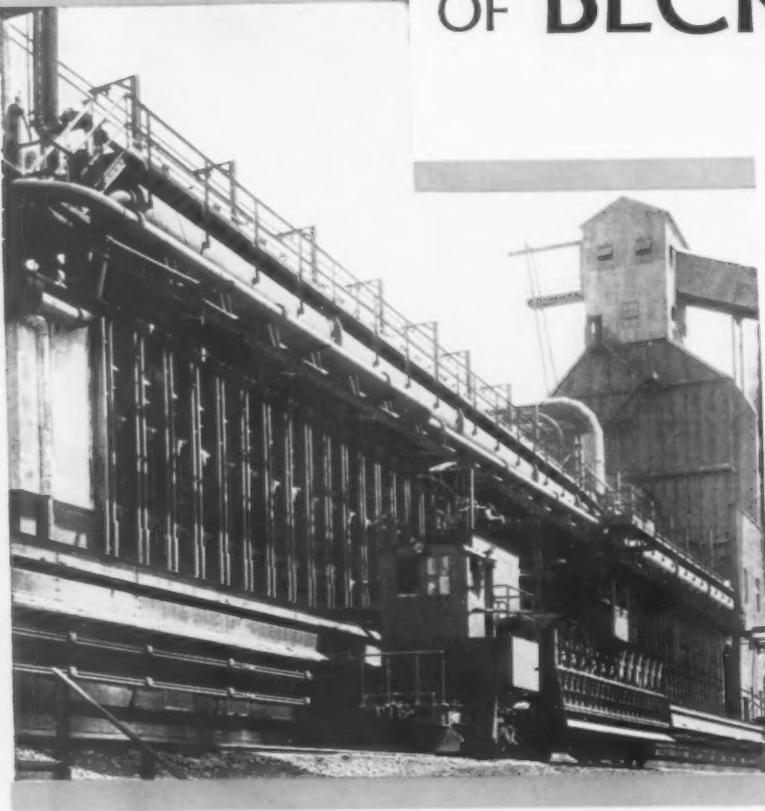
## WHEELOCK, LOVEJOY & Co., Inc.

128 SIDNEY ST., CAMBRIDGE A, MASS.

CAMBRIDGE: NEW YORK: CLEVELAND: CHICAGO

October 2, 1930

# **PROGRESSIVE —A DISTINCTIVE FEATURE OF BECKER OVENS**



Whether in the design of equipment or in laying out a plant to derive the maximum advantage from a market situation, progress is a matter of course with Koppers. Every new plant involves the assembly of economic and technical factors into a correct, individual pattern.

operates for its own account plants carbonizing over 7,000,000 tons of coal per year. Its experience enables it to realize for its customers the full advantage of coke and gas production in Becker ovens.

**"Becker Oven Plants assure economical coke and gas production."**

# KOPPERS CONSTRUCTION COMPANY

*THE IRON AGE*, published weekly by the *IRON AGE PUBLISHING CO.*, at 239 W. 39th St., New York, N. Y., U. S. A. Entered as second class matter, June 18, 1879, at the Post Office at New York under the Act of March 3, 1879. \$6.00 a year in U. S.; Canada \$8.50; Foreign \$12.00. October 2, 1930. Vol. 126, No. 14.

# ELEPHANT BRAND

*"Phosphor Bronze"*

REG. U. S. PAT. OFF.

USED by firms that are critical of results, for bushings, bearings, gears, valves, cylinder linings, rods, bolts, propellers, marine hardware, etc., because it offers exclusive qualities and advantages.

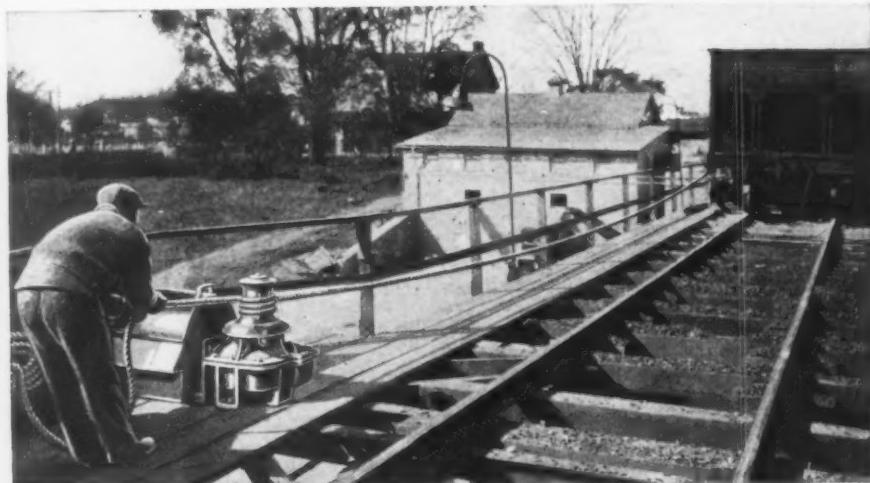
Available in ingots, castings, rods, wire, sheets, ropes, tubes.

Let us explain the uses of the various grades.

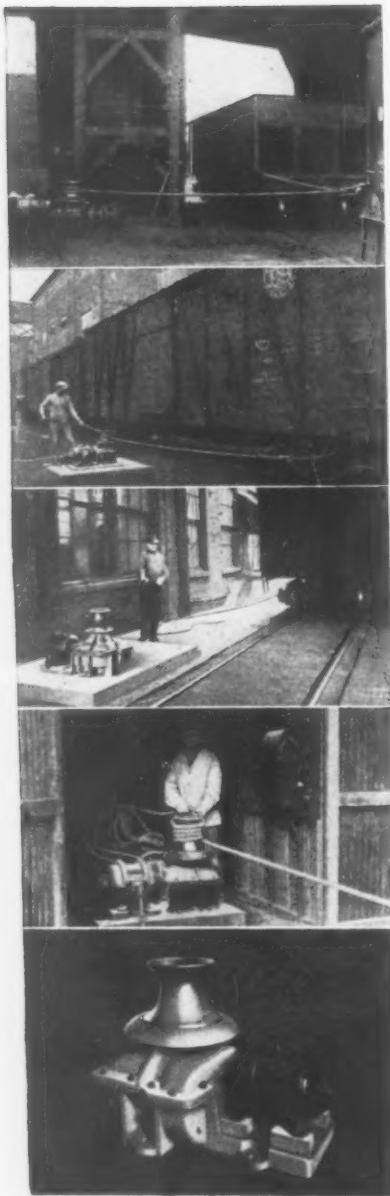


**THE PHOSPHOR BRONZE SMELTING CO.**  
2200 WASHINGTON AVENUE, PHILADELPHIA, PA.

# How Do You Spot R. R. Cars?



*Here's the quick, profitable way*



**I**T COSTS real money every time a gang of men is kept waiting for the loading or unloading of cars.

Check up in your own plant; notice how inability to move a car to or from a siding interferes with the efficient movement of materials both inside and outside the plant. Estimate the cost of such delays over a period of a year, of five years, and you have the reason for the growing use of Caldwell Electric Car Spotters throughout industry.

Pulling in any direction, a Caldwell Car Spotter moves from one to six cars. It may also be used for moving heavy bulky objects when necessary. Always ready, there's no need to wait for the switch engine, or to resort to slow, dangerous hand methods. Priced exceptionally low, due to simplicity of design and use of standardized parts. Write for Bulletin 992 which gives full details.

H. W. CALDWELL & SON CO.

DIVISION, LINK-BELT COMPANY

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New York: 2676 Woolworth Bldg.

C-144

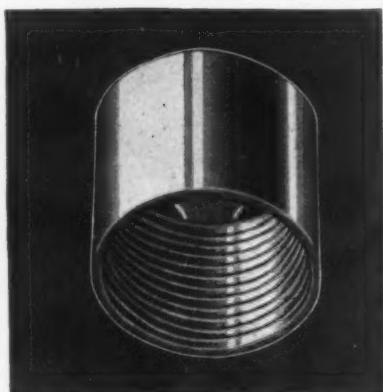
Dallas: 1101 Mercantile Bank Bldg.

# CALDWELL

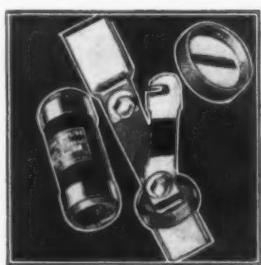
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CONVEYORS - ELEVATORS - POWER TRANSMISSION EQUIPMENT

# GREATER SIMPLICITY... FEWER PARTS... Quicker, Easier Renewals are Features of the New



Caps are one piece, insuring positive contact with the clips.



The knife-blade type Union Renewable Fuse also has an exclusive system of venting, few parts, substantial construction—and a link notched at both ends to permit quick, easy renewals. These features and the rugged grey horn fibre casing are a guarantee of longer fuse life—a new fuse for the price of a link.

## UNION JEFFERSON *Ferrule Type Renewable* **FUSES**

USERS who have seen the new ferrule type Union Renewable Fuse declare it the simplest, most practical, easiest fuse to renew.

Besides the link there are only three parts—two caps and the casing. And the caps have no loose washers to drop or lose. To renew, simply unscrew the caps—pull out the link, insert a new one, screw on the caps—and the fuse is ready for service.

It is designed to withstand blowout after blowout—reducing yearly fuse costs. Venting which relieves the pressure caused by the blowing of the link, and makes long life possible, is secured by an exclusive method—through the end caps, not the threads.

The link is held diagonally in the heavy horn fibre casing—keeping it from touching and charring the fibre, or interfering with the accuracy of the rating. The link is supplied bent at only one end. The straight end is inserted in slots and bent over, insuring correct fit automatically. Slots are large for easy cleaning and inspection and are so shaped that the link can not twist.

Jot down a sample order for use on a few of your most troublesome circuits. Actual use will prove these superiorities. We will be glad to tell you which wholesalers handle Union Renewable Fuses in your territory.



# JEFFERSON ELECTRIC COMPANY

1590 South Laflin Street, Chicago, Ill.

### NEW HANDY FUSE WRENCH



The handiest tool for tightening and loosening ferrule type renewable fuse caps. Comfortably-sized hard wood handle, with hole in each end—one for fuses of 1 to 30 amp., 250 volt size; the other for 31 to 60 amp., 250 volt, and 1 to 30 amp., 600 volt. Your wholesaler has it.

(1017)

# A New Aircraft Engine . . .



Western Aircraft Engine, built by Western Enterprise Engine Co., Los Angeles, California, mounted in an Eagle Rock biplane.

## **With Proved and Dependable VANADIUM STEELS In Crankshafts and Other Parts**

DEVELOPED by Western Enterprise Engine Company of Los Angeles—a company with many years of experience in the design and construction of gas, distillate and Diesel engines—the Western Aircraft Engine is equipped with Vanadium Steel in its two-piece crankshaft, connecting rod cluster, connecting rod master, and the six pieces which comprise the connecting rod links.

Since the pioneering trans-Atlantic flight, record after record has been made in the air with engines equipped with Vanadium Steel in vital parts. Engines that have spanned the Atlantic, the Pacific and the Poles have proved the dependability of Vanadium Steels in engine parts

where high strength, great toughness and resistance to fatigue were the vital essentials.

Perhaps your product will be better—possibly your manufacturing equipment will be more dependable and longer-serving—with stronger, tougher and more durable Vanadium Steels in important units. May we discuss the matter with you? Write us today.

### VANADIUM CORPORATION OF AMERICA

120 BROADWAY, NEW YORK, N. Y.  
CHICAGO PITTSBURGH DETROIT  
Straus Bldg. Oliver Bldg. Book Tower

Plants at  
Bridgeville, Pa., and Niagara Falls, N. Y.  
Research and Development Laboratories at  
Bridgeville, Pa.



**FERRO-ALLOYS**  
of vanadium, silicon, chromium and titanium; silico-manganese, tungsten and molybdenum, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

# VANADIUM STEELS

*for strength, toughness and durability*

# Profit by this NEW IDEA HOLDS IN PUNCHES SECURELY

**RELEASES FREELY**

FREELY interchangeable under all service conditions, Hercules Interchangeable Punches and Retainers make it unnecessary to hold up production and remove dies from the press to replace worn or broken punches.

Even on the heaviest work Hercules Punches remain as interchangeable as drills in a drill press. A detent with large bearing surface holds the punch secure against severest stripping strains, yet always ready for quick removal.

Hercules Punches lend themselves profitably to practically all punching operations — setting new standards of performance. Their precision, superior steel and controlled heat treatment result in a punch vastly superior to the usual product.

The Hercules interchangeable punch system will effect great savings over your present punching practices. Let us show you how it may be applied to your jobs and save money on your die and production costs.

**WHITMAN & BARNES**

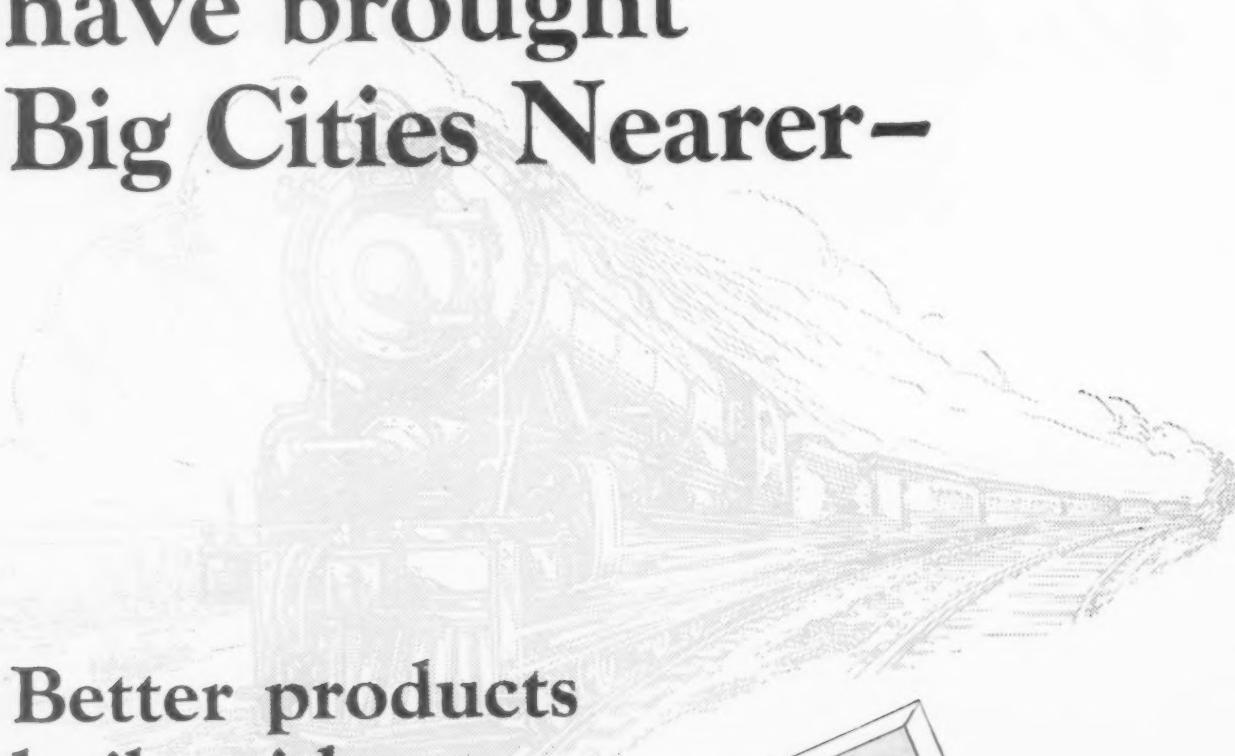
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MAKERS OF FINE TOOLS FOR 76 YEARS

Get the whole story!  
Profit from this new  
idea in punches from  
the very start. If you haven't received your copy  
of Catalog No. 94, write for one now.



# HERCULES INTERCHANGEABLE PUNCHES AND RETAINERS

# Great Trains have brought Big Cities Nearer-



Better products  
built with-



## Die Castings

are cutting down those great spaces  
between initial inquiries and the  
satisfaction that leads to faster sales.

**THE NEWTON DIE CASTING CORPN.**  
146 Munson Street  
New Haven, Conn.

ATTRACTIVE  
PRODUCTS  
*economically produced are half the  
selling battle.*

NDC-26

## FRESH . . . AT THE END OF THE FURROW!



**T**HE pungent odor of newly turned earth. Row on row of deep, even furrows, as far as the eye can see. At the end of the furrow stands a giant tractor . . . fresh, eager for more work . . . even after ten hours of consistent plowing! A far cry, indeed, from that classic, dismal figure of the poet . . . "The plowman homeward plods his weary way..."

Thank the tireless tractor for the liberation of the farmer! Thank the unending energy of this mechanical giant for today's huge crops—so important a factor in our present standard of luxurious living.

And thank alloy steels for the tractor! For ordinary steels are too fragile, too weak to withstand the punishing grind to which modern farm machinery is subjected.

Agathon Alloy Steels have solved the metal problems of many a machinery manufacturer. And Agathon Alloy Steels can solve your metal problems, too—economically, efficiently.



Republic Steel Corporation, world's largest producers of alloy metals, maintains a staff of distinguished metallurgists for your convenience. These specialists will be glad to consult with you. They'll designate a specific metal to meet your

needs; create an entirely new alloy for you, if necessary. Their services involve no obligation. A line on your letter-head will arrange a conference. Simply address: Central Alloy Steel Division, Republic Steel Corporation, Youngstown, Ohio.



# REPUBLIC STEEL CORPORATION

# "MOST UP-TO-DATE"

*said the Operator*

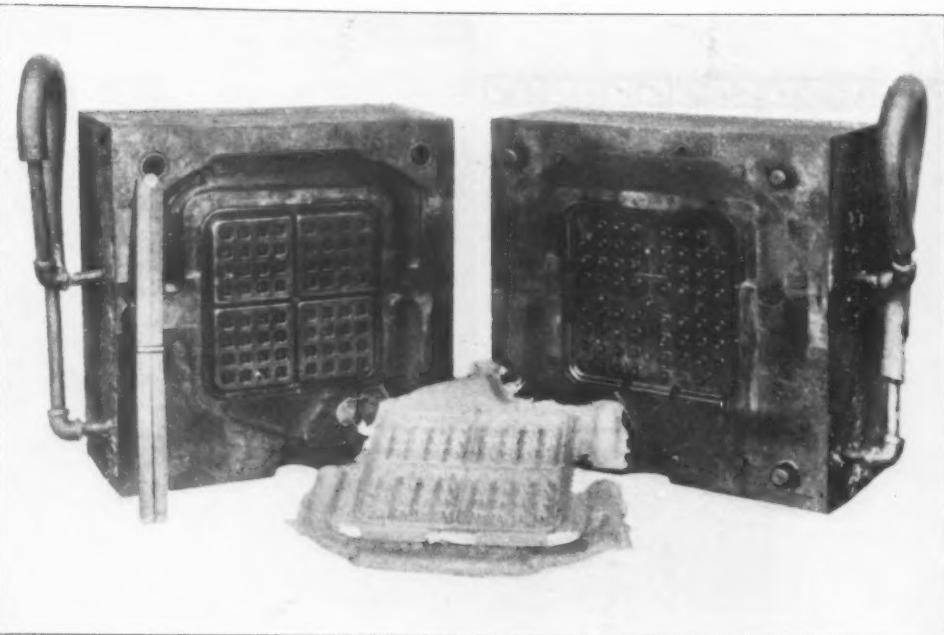


SEMET-SOLVAY ENGINEERING CORPORATION designed and built this screening station for SLOSS-SHEFFIELD STEEL AND IRON COMPANY at Birmingham, Ala. Coke can be loaded simultaneously on six tracks, permitting rapid shipment of clean, accurately-sized fuel to meet any market demand.

Semet-Solvay Engineering Corporation applies to its designing of coal gas and water gas plant fuel handling systems, the widest technical and operating experience in coke and gas production.

Your inquiries are invited, whether you need a complete new unit, or only minor changes to installed equipment.

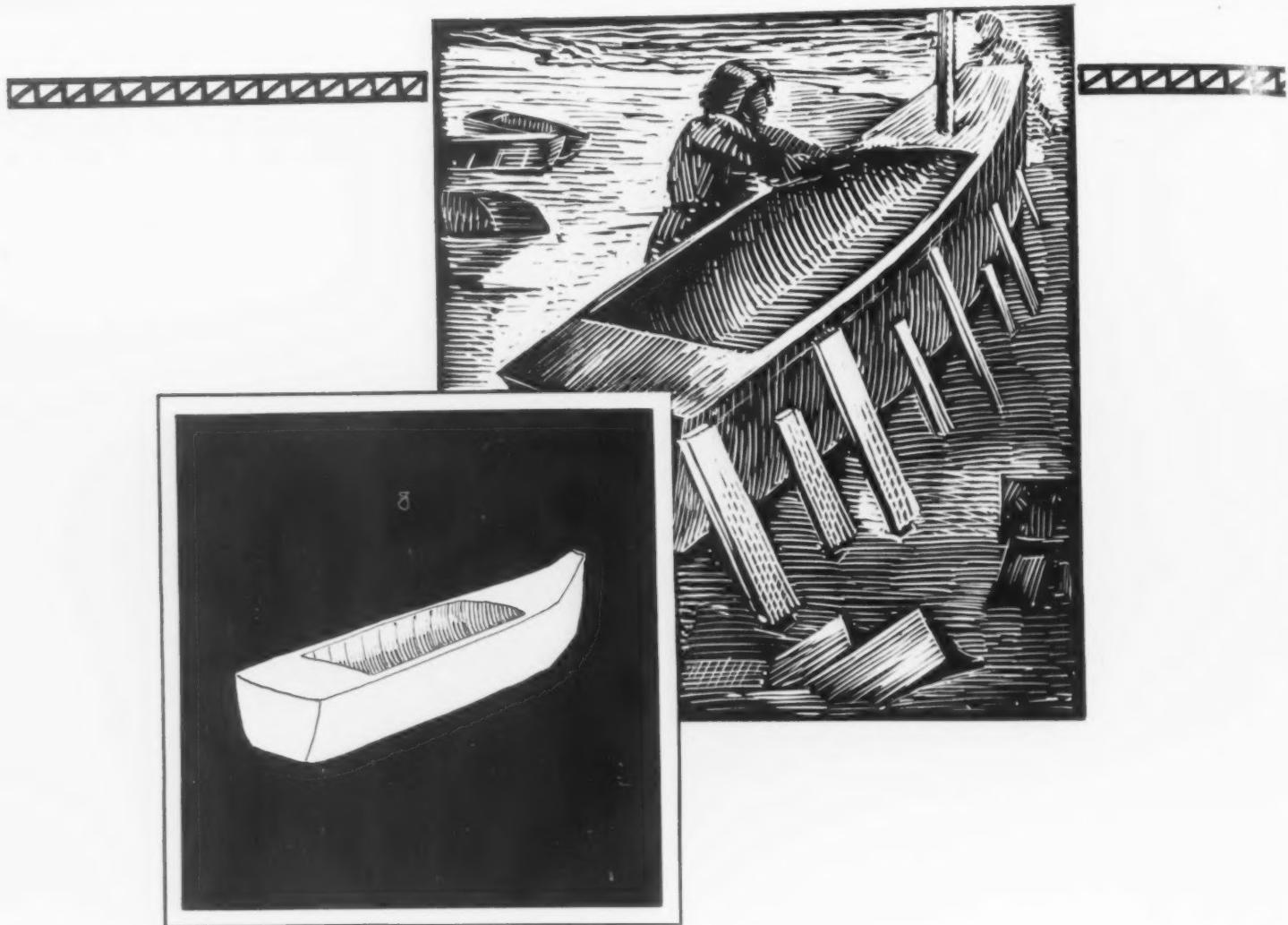




# VASCO MARVEL HOT DIE STEEL

85,000 waffle-iron grids produced by this die casting die made of VASCO MARVEL at the time this photograph was taken. But this record is not top production by any means. If you use hot die steels Vanadium engineers have an interesting story to tell you about MARVEL.





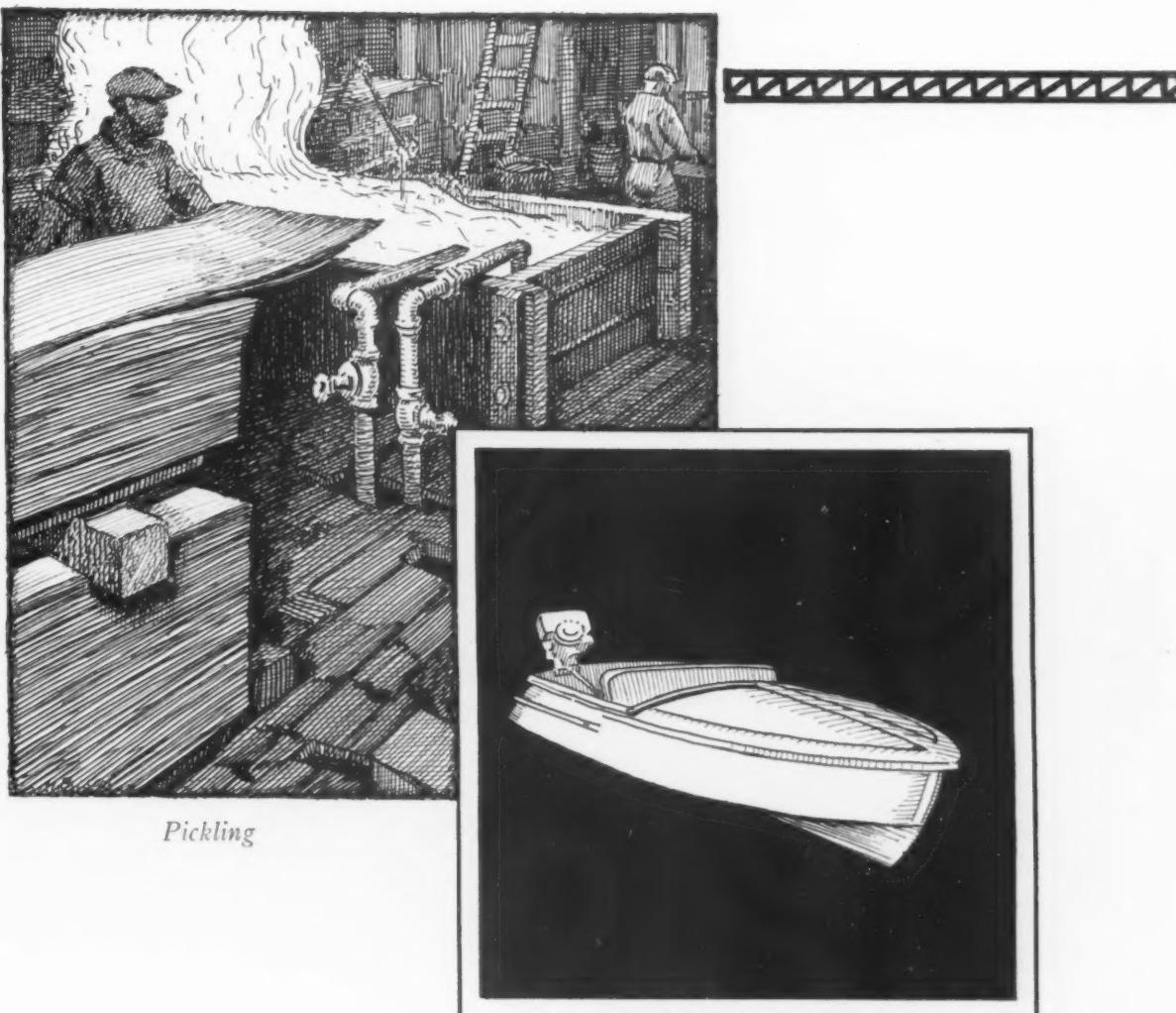
## Guild Ideal of Doing One Thing Well Now

History records that early in mediaeval times it was a recognized fact that it was best to do one thing well. In 1363 craftsmen were by law required to stick to one guild. Apprentices were accepted for but one craft and were prohibited by law from following no other work excepting that to which they had been apprenticed. Thus began the idea of specialization six centuries ago. Six hundred years experience has served to emphasize the importance and worth of this idea of doing one thing well—specialization.

**Black Sheets**  
**Automobile Sheets**  
**Metal Furniture Sheets**  
**Ceiling Stock**  
**Locker Stock—Regular and Special**  
**Japanning Stock—Regular and Special**  
**Single Pickled Sheets**  
**Bow Socket Sheets**  
**Milk Can Stock**



**E M P I R E**



## Kept Alive by Empire Steel Specialization

- Enameling Stock
- Auto License Plate Stock
- Nickel Plating Stock
- Full Pickled Sheets
- Electrical Sheets
- Copper Bearing Sheets in all Finishes
- "Wabik" Metal—(Special Vitreous Enameling Stock)

Fully realizing the advantages of specialization, Empire Steel Corporation has steadfastly refrained from the temptation to manufacture anything but the one special line. Undivided attention is devoted solely to the manufacture of steel sheets. It stands to reason that this concentration has made possible a superior product which merits your consideration.

**EMPIRE STEEL CORPORATION**  
Mansfield, Ohio

*Sales Offices:* New York-Philadelphia-Cleveland-Detroit  
Chicago, 520 No. Michigan Ave.-Indianapolis-St. Louis

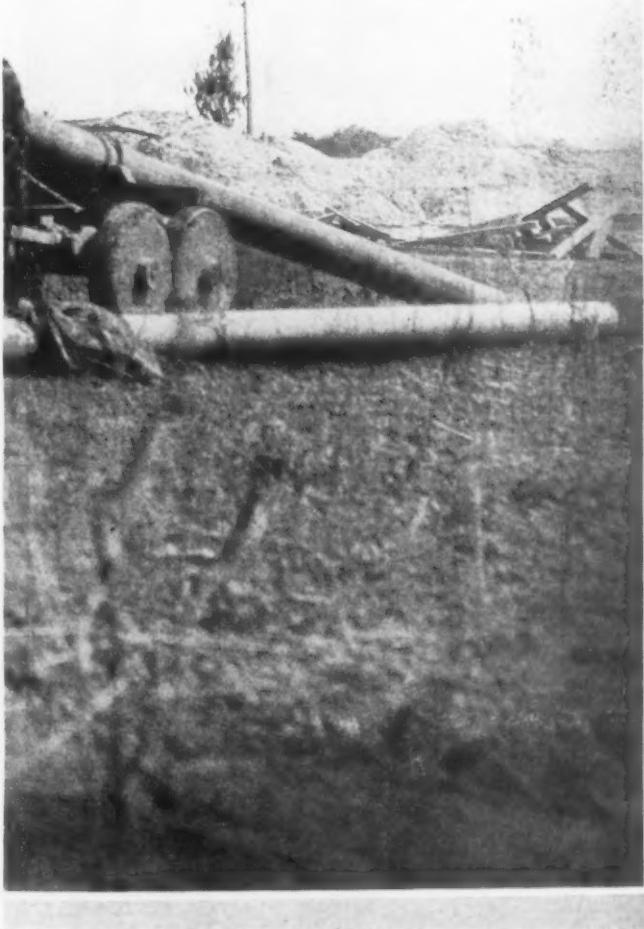
**Steel Sheets**



# SMITHWELDED



The ability of SMITH-Welded Line Pipe to stand rough treatment saves many minutes—minutes that quickly mount into more miles of completed pipe line.



A. O. SMITH CORPORATION  
General Offices: Milwaukee, Wis.

Oil and Gas Field Products Division

*District Offices at:*  
*New York • Tulsa • Houston • Los Angeles*

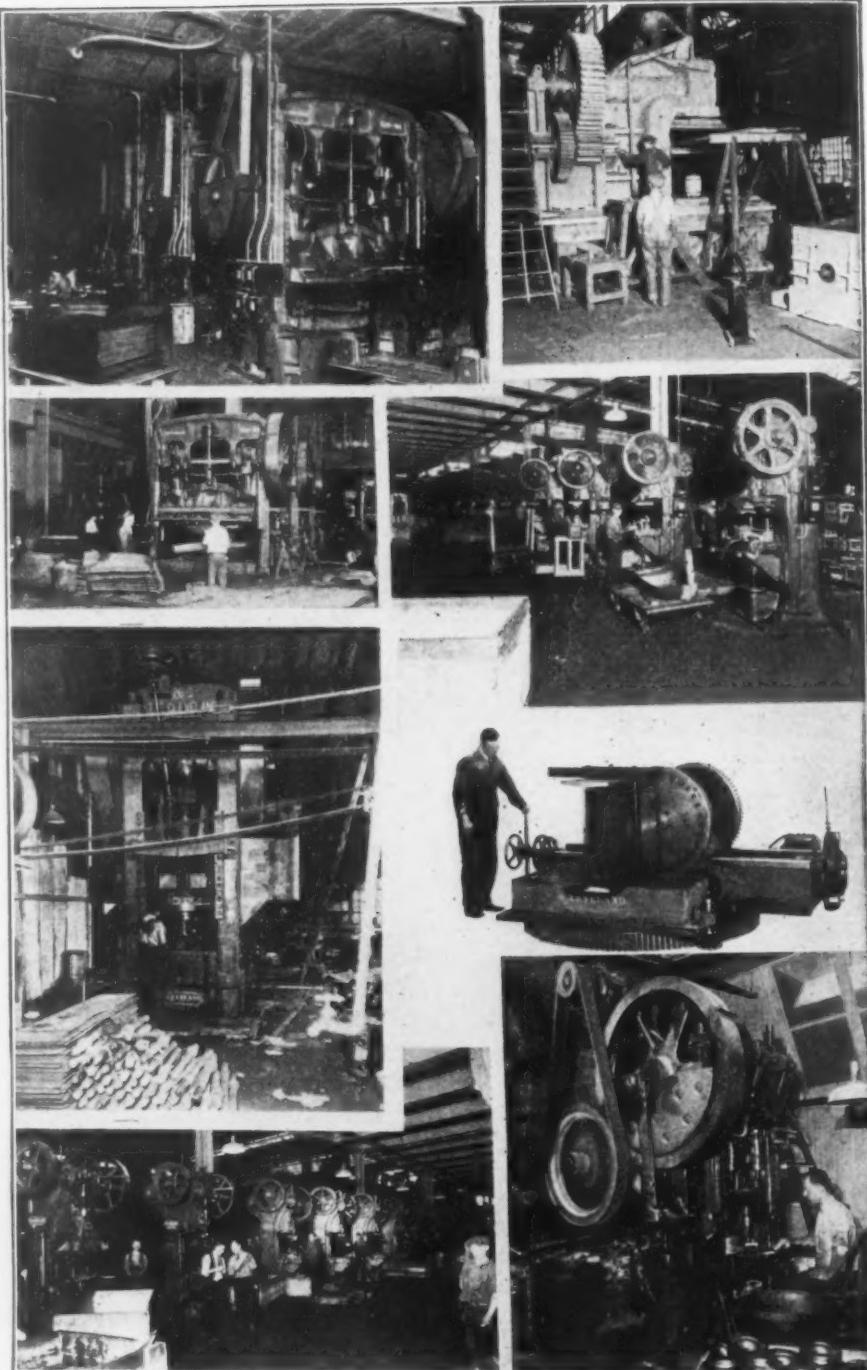
# LINE PIPE

# CLEVELAND

The diversity of products manufactured by us includes every type and size of Power Press from the smallest Open Back Inclinal to the largest Single and Double Crank Toggle; Fabricating Tools such as Punches, Shears, Bending and Straightening Rolls, Rotary and Plate Planers, Flanging Clamps and Wall Radial Drills; Small Tools including Punches, Dies, Rivet Sets, Shear Blades, Coupling Nuts, Pistons, Chisels and Chisel Blanks.

The illustrations shown of various tools are more or less typical but they could be multiplied hundreds of times and if you are interested in any of the products listed above the probabilities are that we can refer you to some user in your particular neighborhood.

Cleveland Power Presses are being used so extensively that it is practically impossible to list many products being produced on them; however, if you have a stamping, forming, blanking, piercing or any other problem involving the use of Power Presses our engineers will be pleased to give you the benefit of their practical experience in selecting the proper press for your particular requirements.



#### POWER PRESSES

FROM THE SMALLEST  
OPEN BACK INCLINABLE  
TO THE LARGEST SINGLE  
AND DOUBLE CRANK TOGGLE.

#### FABRICATING TOOLS

PUNCHES, SHEARS,  
PLATE AND ROTARY  
PLANERS, BENDING AND  
STRAIGHTENING ROLLS,  
WALL RADIAL DRILLS.

#### SMALL TOOLS

PUNCHES, DIES,  
RIVET SETS, CHISELS  
AND CHISEL BLANKS  
SHEAR BLADES, PISTONS  
COUPLING NUTS.

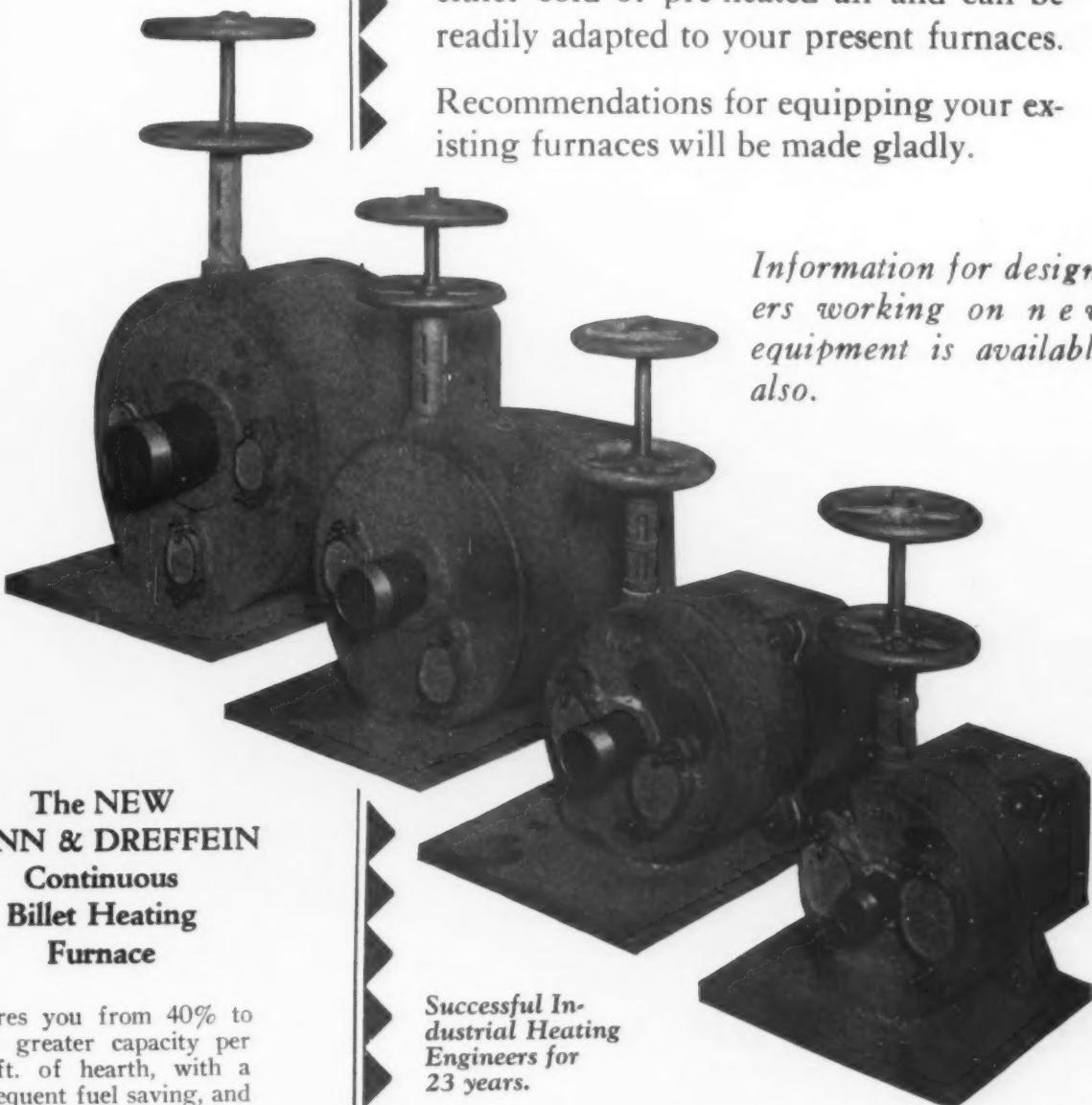
**THE CLEVELAND PUNCH & SHEAR WORKS CO.**  
CLEVELAND OHIO, U.S.A.  
NEW YORK — CHICAGO — DETROIT — PITTSBURGH

Results are guaranteed  
when you use—

## FLINN & DREFFEIN RAW PRODUCER GAS BURNERS

These burners are a great forward step in industrial heating economy. Besides an appreciable saving in fuel, you obtain better control of heat and a decided saving on labor charges. They are built to handle either cold or pre-heated air and can be readily adapted to your present furnaces.

Recommendations for equipping your existing furnaces will be made gladly.



The NEW  
**FLINN & DREFFEIN**  
Continuous  
Billet Heating  
Furnace

assures you from 40% to 60% greater capacity per sq. ft. of hearth, with a consequent fuel saving, and freedom from scaling and slagging of billets and slabs.

Let us give you the complete details.

**Flinn & Drefein Company**

308 West Washington St.

Chicago, Ill.

**J & L**  
**MAKES ALL OF**  
**THESE STEEL**  
**PRODUCTS**

**enabling you to obtain,  
from a single reliable  
source . . . steel for  
practically every need**

**S**TANDARDIZE on J & L Steel. You can, because during its three-quarters of a century of experience in iron and steel making, the Jones & Laughlin Steel Corporation has constantly added new products to its line until there is, today, a J & L Product to meet practically every requirement for steel. All your operating departments will be supplied with steel of uniform quality and, in addition, you will save all the time, clerical labor and overhead expense that division of purchases among many makers entails upon your organization.

While you may order from the J & L mills at Pittsburgh and Aliquippa, Pa., for regular requirements, in emergencies you have the advantage of being able to obtain quickly, from J & L Warehouses in Chicago, Cincinnati, Detroit and Pittsburgh, J&L Steel Products of the same quality you are accustomed to receiving on mill orders.

**OPEN HEARTH  
AND  
BESSEMER STEEL**

**HOT ROLLED PRODUCTS**

Billets	Blooms	Slabs	Sheet Bars	Skelp
Bands	Flats	Hexagons	Squares	
Rounds				

Angles	Beams	Channels	Tees	Zees
Agricultural Shapes			Special Shapes	
Light Weight Stair Stringer Channels				
Plates for Bridges, Tanks, Boilers, Cars and Ships				

**RAILROAD SPIKES**      **TIE PLATES**  
Light Rails and Accessories

**BARS FOR CONCRETE REINFORCEMENT**  
(Straight, Bent and Fabricated)

**FORGING STEEL**

**JALCASE STEEL**  
Hot Rolled      Cold Finished

**COLD FINISHED STEEL**

Rounds	Squares	Hexagons	Flats	Special Shapes
Free Cutting Screw Stock				
Shafting (Turned and Ground, Turned and Polished, Cold Drawn)				
Pump and Piston Rods				

**JUNIOR BEAMS**

**STEEL PILING**

**FABRICATED STRUCTURAL WORK**

Columns	Girders	Trusses
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Mill and Factory Buildings		

**TUBULAR PRODUCTS**

Standard Pipe	Line Pipe
Casing, Tubing, Drive and Rotary Drill Pipe in Lapwelded and Seamless	

**WIRE PRODUCTS**

Wire Rods		
Bright, Annealed and Galvanized Wire		
Spring Wire	Barbed Wire	Woven Fencing
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Fence Staples		Netting Staples

**TIN MILL PRODUCTS**

Coke Tin Plate	Black Sheets (Tin Mill Sizes)
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**COKE BY-PRODUCTS**



**JONES & LAUGHLIN STEEL CORPORATION**

AMERICAN IRON AND STEEL WORKS

**JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA**

*Sales Offices:* Atlanta Boston Buffalo Chicago Cincinnati Cleveland Dallas Detroit Denver Erie Los Angeles  
Memphis Milwaukee Minneapolis New York Philadelphia Pittsburgh St. Louis San Francisco Washington

*Warehouses:* Chicago Cincinnati Detroit \*Memphis Pittsburgh

\*Distributing Warehouse for Pipe, Wire Products, Sheets, Spikes and Bars for Concrete Reinforcement

*Canadian Representatives:* JONES & LAUGHLIN STEEL PRODUCTS COMPANY, Pittsburgh, Pa., U. S. A., and Toronto, Ont.

# We hope you USE SPRINGS

... We have been making them for eighty-four years, at least, so we've been told.

... Even so, we don't know all about Springs but all we do know is about Springs. That knowledge is yours for the asking.

... The spring business is peculiarly like the old village blacksmith. He puts shoes on the horse that you bring to him.

... We don't stock up a lot of springs and then go around trying to sell them. We have to wait for you to tell us what you need. Each and every spring we make is especially made to fit your special needs.

... We make springs of round wire, square wire, oblong wire; we make them to

stretch, we make them to compress, and we make torsion springs.

... We take flat spring steel and stamp out every conceivable shape from dies that are made to suit your wants.

... We not only know how to do that but we can harden and temper them to suit your needs and can give you most any kind of a finish you want.

... We will try our best to make them at a price that will suit your pocketbook and in ample time to suit your needs.

... We will write you quotations or will call and discuss the matter with you. We will tackle your problems as though they were our own and we will be just as nice and dependable as we know how.

An Inquiry from you??  
We'll do the rest

**THE DUNBAR BROTHERS CO.**  
QUALITY SPRINGS SINCE 1845  
BRISTOL, CONNECTICUT



Quality  
Spring  
since  
1845





**BARNES  
MADE**

**Screw Machine  
PRODUCTS**

to special specifications  
or exacting tolerances

Any material up to  $1\frac{1}{4}$ " diameter



*May we quote?*



**BARNES  
MADE**



**Cold Rolled Spring Steel**

Annealed or tempered  
Regular Carbons in stock or  
Special Analyses to order

Great many sizes on hand  
for immediate shipment

*Ask for our quarterly "stock" list*

# Barnes-made Springs

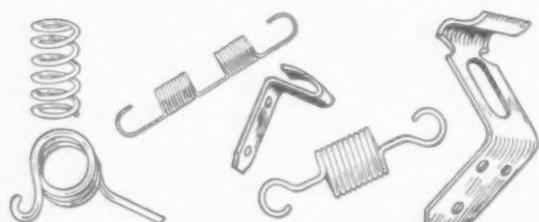
## Small Stampings and Spring Washers

ANY KIND — FLAT — SPIRAL — TORSION  
ANY QUANTITY — ONE TO A MILLION  
ANY MATERIAL — DELIVERIES TO SUIT

*Watch for our Green Insert*

**THE WALLACE BARNES CO., BRISTOL, CONN.**

**I**T takes Knowledge  
to design a good spring



It doesn't show so much on the surface,  
but a good spring has to be designed  
for its particular work. Consult  
our engineering department with your  
spring problems. We will be glad to  
help you solve them and with no  
obligation on your part.

*Send us your inquiries for estimates  
on coil springs, flat springs, special  
wire forms, and small stampings.*

**RAYMOND MFG. CO.**  
CORY, PENNSYLVANIA

**WE DO GET 'EM OUT**

**GIBSON-SPRINGS**

ANY DESCRIPTION  
ANY MATERIAL

**WM. D. GIBSON CO.**

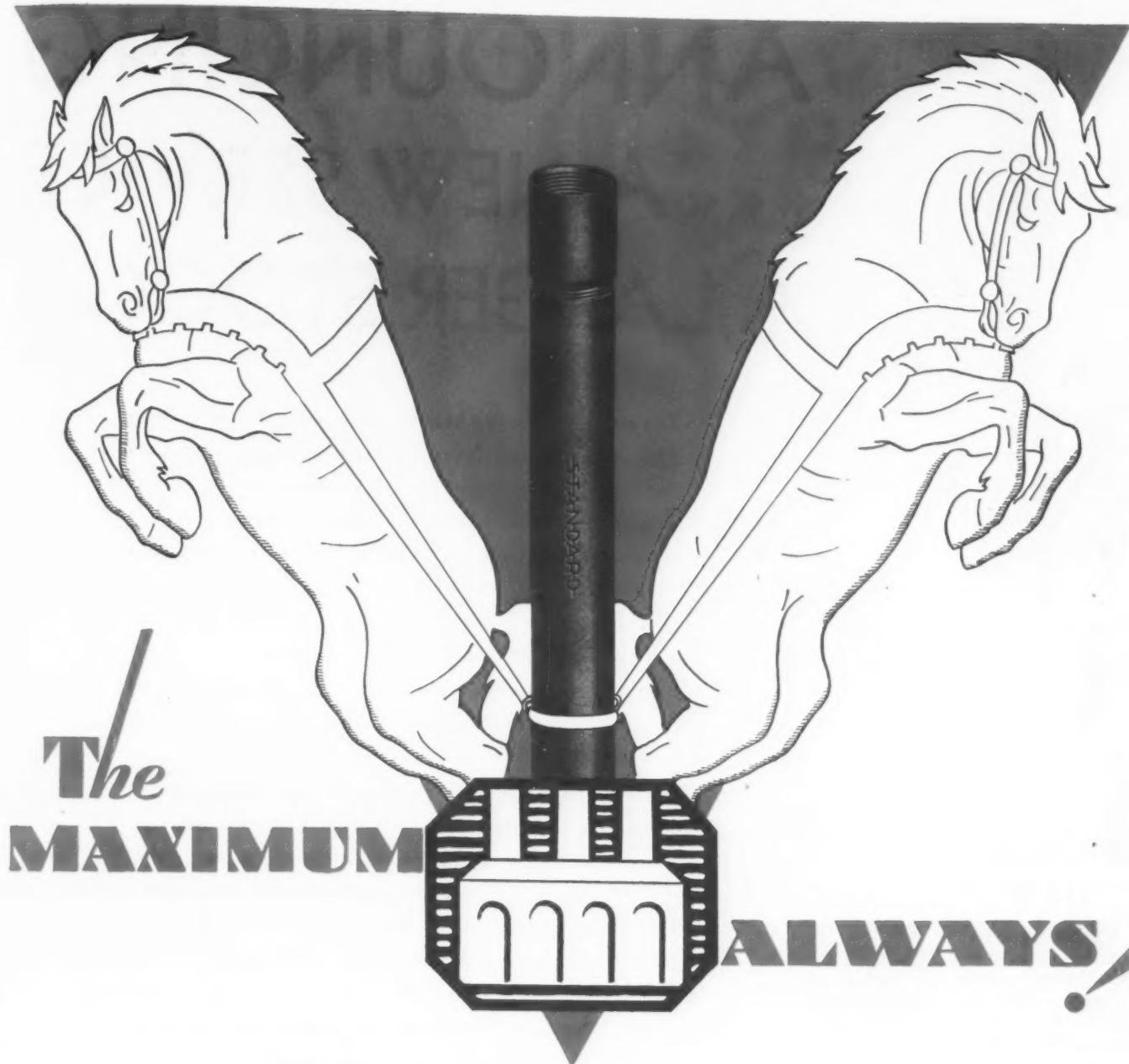
1800 CLYBOURN AVENUE  
CHICAGO, ILL.

**PLANTS FOR SPRING SERVICE**

**DETROIT DIVISION**  
6400 MILLER AVENUE, DETROIT

**COOK SPRING CO. DIVISION**  
ANN ARBOR, MICHIGAN

OF  
**BARNES-GIBSON-RAYMOND**  
INCORPORATED



*The*  
**MAXIMUM** **ALWAYS!**

Behind the super-power of many modern power plants is the super-strength of "Standard" Seamless Power Piping—securely harnessing the powers of thousands of steam horses—safely guarding the pent up force of super-heated steam and sending it to the tasks of industry.

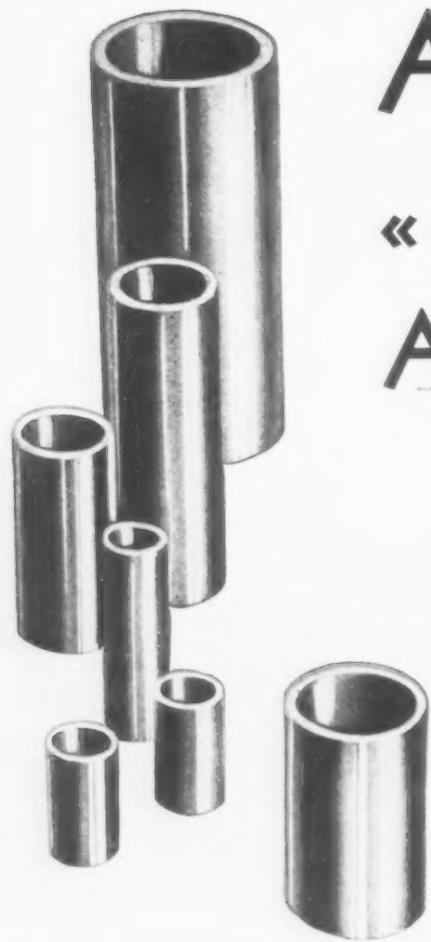
"Standard" Seamless is nationally distributed and readily available in any size, dimension or standard specification.

### SPANG, CHALFANT & CO., INC.

*General Offices: CLARK BUILDING, PITTSBURGH, PA.*

*Sales Offices: CHICAGO, ILL. NEW YORK, N. Y. ST. LOUIS, MO. PITTSBURGH, PA. TULSA, OKLA. LOS ANGELES, CAL.  
Welded Mills: ETNA, PENNA. SHARPSBURG, PENNA. Seamless Mills: AMBRIDGE, PENNA.*

**STANDARD**  
**Seamless Steel**  
**POWER PIPING**



**Write For This  
NEW  
Stock List**

Write for our new stock list card . . . showing dimensions of 500 Bunting "Ready Made" ready-for-assembly bronze bushing bearings, which you can procure as you need them and at sharply reduced prices. Any quantity is instantly available at any time. This card should be in every engineering department, drafting room and shop. Write for it.



# ANNOUNCING « « « A NEW SERVICE A LARGER STOCK » »

You can have a Bunting bearing engineer in your plant within 24 hours to counsel with you on the design, alloy and application of the bearings in your product. Such engineering counsel does not cost you anything nor obligate you in any way. It is a new service rendered by our staff of traveling engineers who will apply to your individual bearing problem the new and valuable knowledge gained in our research work in collaboration with the United States Bureau of Standards.

New and lower prices are now effective on all Bunting Quality Phosphor Bronze Bushing Bearings. Readjust your cost figures in conformity with this reduced price of bronze bearings.

We have added 50 sizes to our list of Bunting "Ready Made" completely machined and finished Bronze Bushing Bearings, always carried in stock for immediate delivery at the factory and all Bunting branches. These new added sizes greatly expand the application of "Ready Made" bearings to all mechanical industry. Write for this new and larger list showing the added sizes and lower prices.

Here are three big, distinct, valuable contributions to a better product and a lower cost in your own operation.

**THE BUNTING BRASS & BRONZE COMPANY  
TOLEDO, OHIO**

Branches and Warehouses at New York, Chicago, Boston, Philadelphia, San Francisco  
Export Office—Toledo, Ohio



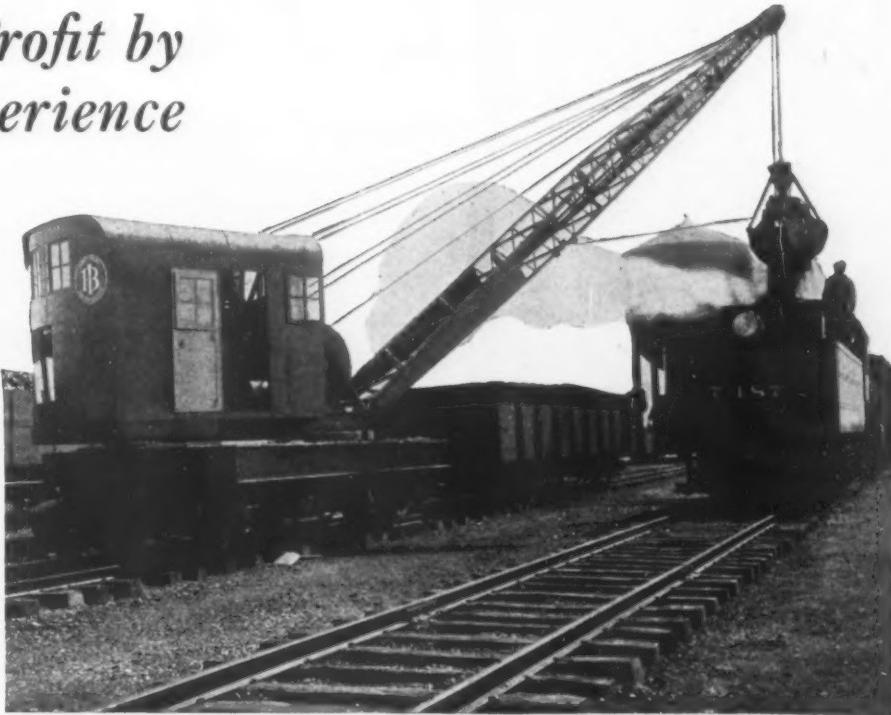
**BUNTING**  
**QUALITY**  
**PHOSPHOR BRONZE**  
**BUSHING BEARINGS**  
PATENTED

# JUDGE CRANE VALUES THE WAY BIG USERS DO

*You Can Profit by  
Their Experience*

Of all the locomotive cranes in service, those purchased by the railroads, iron and steel companies and the big utilities are the ones most often bought solely on performance records. Some of these companies use and keep costs on hundreds of cranes, their handling work is hard, and they employ large engineering staffs who know crane design and pass on every purchase. Consequently, their judgement is valuable to anyone interested in the economical handling of materials.

Go to any of these large plants throughout the country and ask their opinion about an Industrial Brownhoist. Let them tell you that no better cranes have ever been built, that they will handle materials at a lower cost per ton and that they will stand



Thirty-ton capacity Gasoline Powered Locomotive Crane coaling a locomotive. Because of their fast operating speeds and dependability, thousands of Industrial Brownhoists are used by the Nation's Railroads for all kinds of handling work.

up better and last longer. Consider, too, that this is not just idle talk because these same industries have bought far more Industrial Brownhoists than any other make of locomotive crane.

Industrial Brownhoists are sold by our own factory-trained men. Discuss your material handling methods with them and you will find that their experience makes possible many helpful suggestions. There is no obligation, of course.

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.

Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

# INDUSTRIAL BROWNHOIST



# Baker

**I**N THIS YEAR of smaller profit margins, the concern with the lowest production costs will win. We are prepared to prove that Baker Trucks can reduce handling costs in production by as much as 75%. And that, too, without adding to capital charges because Baker Trucks actually pay back their entire purchase price—in payroll saved—in from 3 to 12 months.

Baker Industrial Truck Division of  
**THE BAKER-RAULANG COMPANY**  
2180 West 25th St. .. Cleveland, Ohio

**MAYARI NICKEL - CHROMIUM STEELS**

# Made by the pioneer makers of **Nickel- Chromium Steels**



When alloy steels were first resorted to, in the search for materials having higher physical properties than the steels then available, it was found that nickel-chromium steels made with the natural nickel-chromium alloy, Mayari Pig Iron, as a base, possessed an extremely desirable combination of the properties that make for long life in service.

The organization which first made these Mayari Nickel-Chromium Steels later became a part of Bethlehem Steel Company. Consequently Mayari Nickel-Chromium Steels, in addition to the inherent excellence and high shock-resistance due to their composition, have a remarkable, though intangible, superiority arising from manufacture by the pioneer makers of alloy steels of this analysis. Long contact with users of alloy steels enables Bethlehem to

focus on each consumer's problem the resources of knowledge and skill that have been accumulated through many years of experience.

If you have a condition that places unusual demands on alloy steel try Mayari Nickel-Chromium Steels. They have built up an enviable reputation for dependability.

**BETHLEHEM STEEL COMPANY**  
General Office: Bethlehem, Pa.

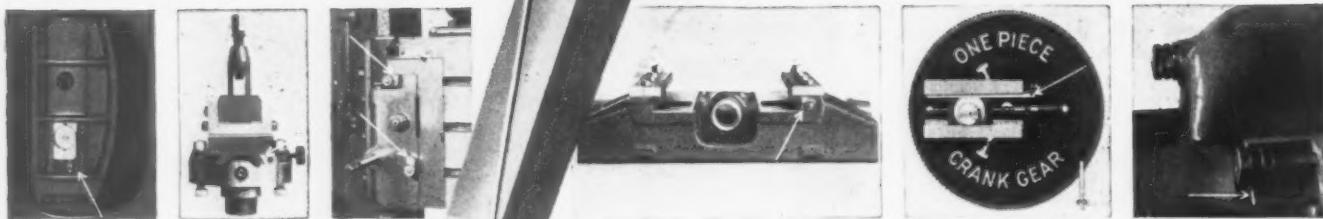
District Offices: New York, Boston, Philadelphia, Baltimore,  
Washington, Atlanta, Buffalo, Pittsburgh, Cleveland,  
Cincinnati, Detroit, Chicago, St. Louis

Pacific Coast Distributor: PACIFIC COAST STEEL CORPORATION,  
San Francisco, Los Angeles, Seattle, Portland, Honolulu

Export Distributor: Bethlehem Steel Export Corporation,  
25 Broadway, New York City

**BETHLEHEM**

# GIBS



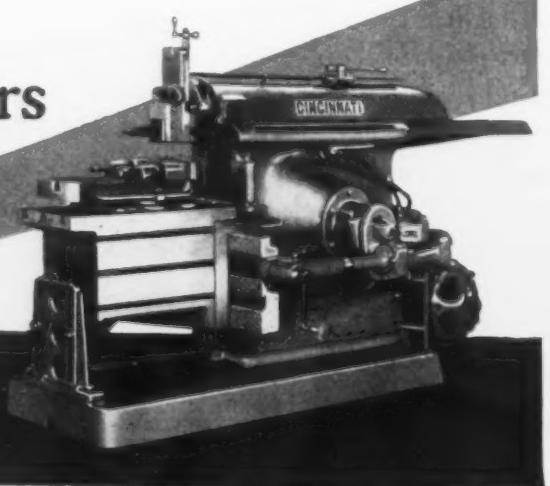
Every flat bearing surface on Cincinnati Rapid Traverse Shapers has a gib. They are full length tapered gibs with a single screw adjustment.

The Cincinnati sliding block is gibbed—an important and necessary feature. The ram bearing has a full length tapered gib which forces the ram bearing to wear straight—an equally important feature.

If you appreciate the value of single screw adjusting full length tapered gibs; if you appreciate the value of a uniform adjustment from a single point; and if you demand a take-up on every flat bearing surface—your next shaper purchases will be limited to Cincinnati Rapid Traverse Shapers.

The Cincinnati Shaper Co., Cincinnati, Ohio

Cincinnati **Shapers**  
*Rapid Traverse*



# The Buyer Cracks the Whip!



**W**HEN you get an order today, the buyer specifies the delivery—how different from those golden days of '29!

And you're probably not carrying the stock of bolts you used to—inventories being what they are these days.

So when that order has to be out in no time at all . . . and you're stuck for bolts . . . call any Russell, Burdsall & Ward office. Three great plants to draw from . . . practically over-night service.

## RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

PORT CHESTER, N. Y.

ROCK FALLS, ILL.

CORAOPOLIS, PA.

Philadelphia • Chicago • Detroit  
San Francisco • Los Angeles  
Seattle • Portland



**TU.**  
Gibbons & J. 95 Reade Street  
Manufacturers of  
**American Hardware.**  
J.S. Coe's & Taft's Pattern Wrenches.  
Auger and Auger Bits.  
Gimlets and Gimlet Bits.  
Shattuck's Family and Counter Nails.  
Yaw's Cow Bell.  
Axe, Pick, Hinge and Hammer Handles.  
Wire Nails.  
Mouse Traps.

**Wire**  
WIRES, FENCING.

**Co.,**  
NEW YORK.

**Co.,**

FIRE

**Sheet Iron,**

**Wire,**

**Solder, &c.**

19 Beekman Sts.

**SKIN**  
AND,

**Cobalt.**

**McCoy,**  
New York.

**SCY,**  
etc.

**SPELTER,**  
"REL.

**Fuller, Dana & Fitz,**

IMPORTERS AND COMMISSION MERCHANTS,

BOSTON, 110 North Street.

Tim Plates, Sheet Iron, Metals, Iron, Steel, Etc.  
Exclusive Boston Agents for the sale of Morris, Tappet & O'Leary's Lap Welded Hollow Tubes, Phoenix Wrought Iron Beams, Columns, etc. Patent  
"The 'Borden Best' Iron  
and Brassware."

**MORTON, REED & CO.,**

No. 65 South Gay Street, BALTIMORE

**METAL BROKERS.**

MANUFACTURERS' AGENTS FOR

Baltimore Machinists' Supply Co.

ALL KINDS

**HOC.**  
HAMILTON  
WIRE

**WIRE**  
No. 1716,  
AT  
Office on

**IRON AND**  
JOHN A.  
TI

INCLINED PLATE  
STANDING  
SUSPENDED  
STEEL

A large stock  
Orders filled v  
exp' for  
which will be

**JASPER**  
MANUFACTURERS

**WIRE**  
Sieves, Riddles,

No. 51 Cliff St.

**Hartford**  
Wire Goods  
Sale.

etc.

# WHAT!

## *Pay for white space?*

The skill of the advertising "experts" of 60 years ago was, seemingly, measured by the amount of material they could crowd in a given space. Each advertisement contained its full quota—sometimes cuts, but always plenty of type in a wide assortment of styles and sizes. No space was "wasted." We can almost hear them say, "What! pay for white space?"

Yet it is not so long ago when the cry was for white space and more white space. It was the new idea in the best advertising circles.

New? How about this advertisement which was published in The Iron Age in 1873! Here is white space, and how it did make the advertisement stand out. Yet radical as this advertisement was, it is doubtful if the idea was entirely new even then. This type of layout had undoubtedly been used by others years before.

And what of future advertising? What will it look like? Will new

methods of presentation and new selling slants be evolved. Probably, but no one knows what the trend will be. Just now it is *all* white space.

So with our industrial future—it is still white space to be filled with the record of tomorrow's accomplishments.

It is with these that the 75th Anniversary Number of The Iron Age to be published November 20, 1930, will be concerned. It will be its function to discover what marks we may now place on the white pages of the future. It is going to look back in order to see ahead. It will penetrate the shadows cast before important events in the past so that we may recognize the shape of the present shadows that are significant of future events.

It will give you a splendid opportunity to present the picture of the part which your products have played in industry in the past and will play in the future.

# 22 Pieces per Hour —200 per Sharpening

A cast iron vise slide—eight surfaces milled fast and accurately by a gang of Brown & Sharpe Cutters.

The cost of	
Time Lost Removing Cutters	
Plus Time Lost Replacing	
Cutters	
Plus Lost Production	
Plus Sharpening Cutters	
Plus Original Purchase	
Equals	
<b>REAL Cost of Cutters</b>	
<hr/>	
What is the Real	
Cost of Your Cutters?	

Two Half Side Milling Cutters, two Milling Cutters and two Inserted Tooth Side Milling Cutters remove ten cubic inches of material per minute at a spindle speed of 49 R.P.M. and a table feed of seven inches per minute.

The production schedule shows an average of twenty-two pieces per hour—a high production which is ably maintained since the gang mills two hundred pieces between sharpenings.

On every job, Brown & Sharpe Cutters afford opportunity of lowering cutter costs. Ask for your copy of Small Tool Catalog No. 31 listing a complete line of cutters. Brown & Sharpe Mfg. Co., Providence, R. I., U.S.A.



*Eight Surfaces — milled rapidly and accurately. The Brown & Sharpe Cutters, at a minimum number of interruptions for sharpening, maintain satisfactorily the fixed distances and relationship between the surfaces.*



## Brown & Sharpe Cutters

*Lower Production Costs*



# INDUSTRIAL STEEL CASTINGS



*The above illustration made from unretouched photographs*



The small castings bay of the Industrial plant is specially organized, equipped and manned for efficient production of castings of the type shown in the above illustration. Users tell us that Industrial castings are exceptionally uniform, clean and sharp, even when the pattern is intricate and involved. Such castings are ideal for machining and actually reduce machining costs . . . The best way to test the suitability of Industrial Steel Castings to you needs is to send a small trial order. Or blue-prints may be mailed for quotation.

THE INDUSTRIAL STEEL CASTING COMPANY - TOLEDO, OHIO

## HAVE YOU CHECKED / / / / BLAST PRESSURE LOSSES BETWEEN STOVES and FURNACE ?

A 5-lb. difference in blast pressure between blowing engine and furnace tuyeres was found at a blast furnace plant. Investigation disclosed the major portion of the loss to be through the angle type of hot blast valve and its connections. Substitution of the Mathesius Hot Blast with its straight-way connections reduces this loss to a few inches of water.

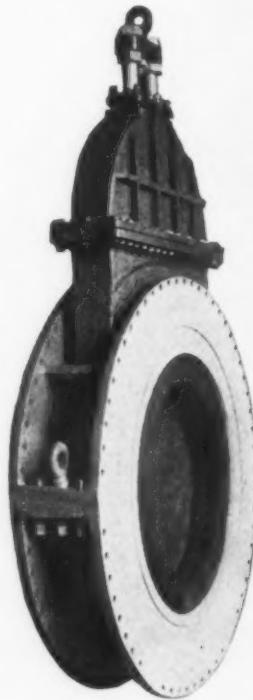
This pressure drop is a direct operating loss in unnecessary steam or power consumption. In many cases, this limitation on the maximum blast pressure delivered at the furnace represents a limitation of pig iron output.

In designing new or remodeling old hot blast stoves or air mains, careful consideration should be given to the type of hot blast valve. This is particularly important where additional blast volumes are required in rebuilt blast furnaces.

### MATHESIUS

#### Hot Blast Valve

This valve consists of a correctly tapered gate swinging and moving freely between two parallel bronze seats. Both gate and seats are water cooled. The advantages of this valve lie in the very low pressure loss thru it, in the absolute prevention of leakage and in the straight-way connection between the stove and hot blast main, which eliminates the right angle bends and difficult brickwork in the mushroom type of valve. There are over 175 installations.



#### FREYN-DESIGN

• • • • •      Let us tell you more about the Mathesius Hot Blast Valve. A descriptive bulletin will be sent at your request.

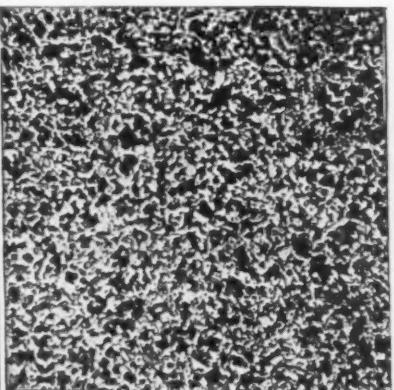
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## Freyn Engineering Company

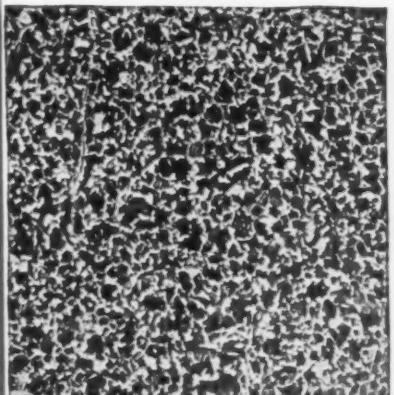
CONSTRUCTORS - ENGINEERS - SPECIALTIES

310 South Michigan Avenue

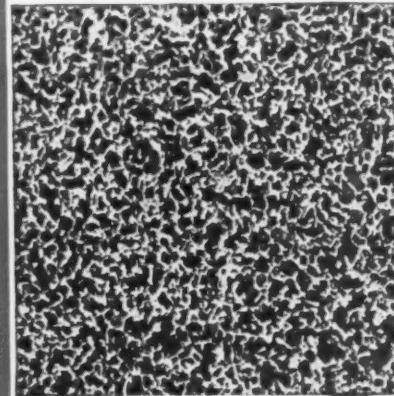
CHICAGO, ILLINOIS



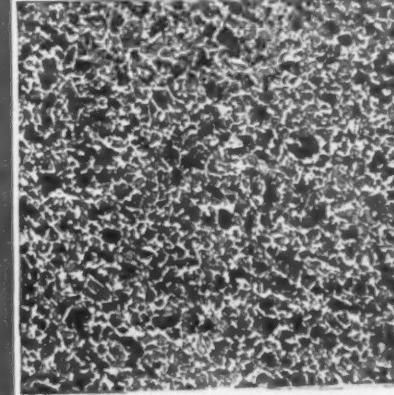
• 39 Carbon 100X  
Normalized



• 40 Carbon 100X  
Normalized



• 43 Carbon 100X  
Normalized



• 48 Carbon 100X  
Normalized

# UNIFORMITY With Densite

- One of the outstanding features of Densite Refined Steel is its uniform grain structure. Microphotographs shown at the left were made from 1" rounds and range from .39 carbon to .48 carbon, 100 ton heats—basic open hearth.
- UNIFORMITY OF PRODUCT is another of the many virtues Densite brings to steel. Of thousands of tons of Densite Refined Steel shipped to many different customers, none have been rejected—in fact not one has required the services of a "trouble shooter" to keep it sold. Densite steels don't come back; they stay sold because of their superior quality. Steels treated with Densite, whether plain carbon or alloy, are cleaner, more uniform and tougher.
- Steel makers and users alike can profit by using Densite. If you make steel, write for further information. If you are a user of steel, specify "Densite Refined" when ordering your next requirement from your REGULAR source of supply, or write us for further information.



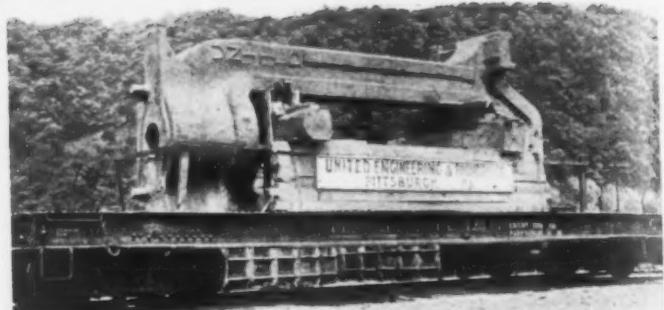

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DENSITE CORPORATION OF AMERICA

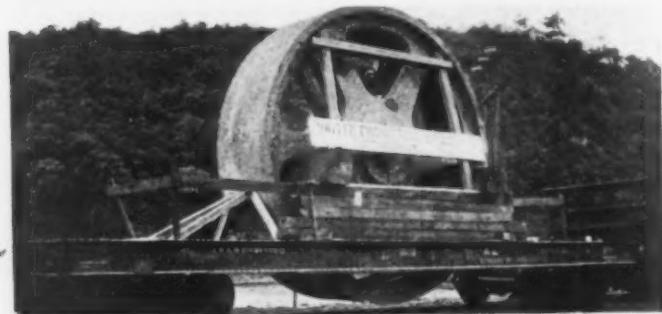
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CLARK BUILDING :: PITTSBURGH, PA.

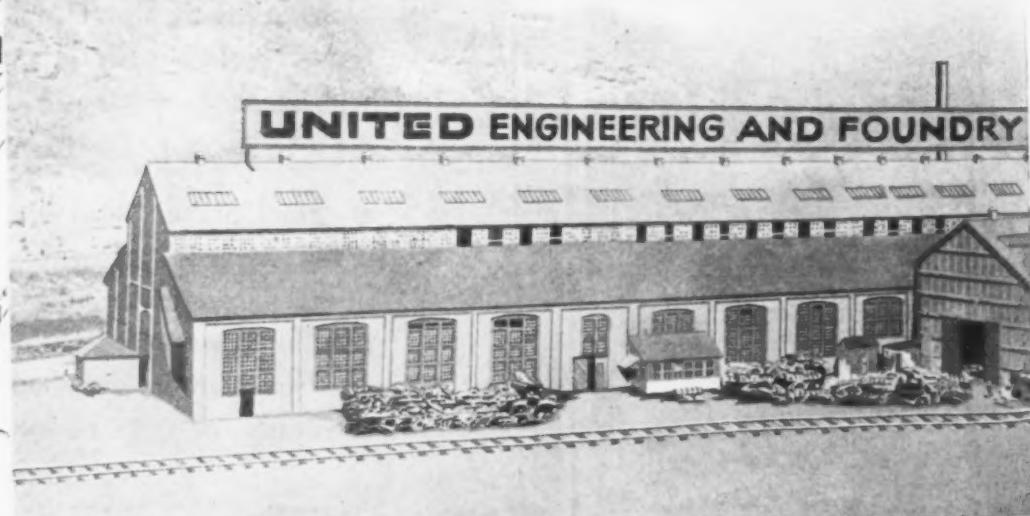
# MASSIVE



Mill Housing. Size 13' 2" x 24' x 5' 2". Weight 165,800 pounds.



Drive Gear. Size 15' 8" P. D. x 52 F. Weight 85,280 pounds.



#### STEEL FOUNDRY, VANDERGRIFT, PA.

Modern in design and equipment, coupled with the application of scientific metallurgical practices, the plant embodies such potent factors in the production of steel castings as to place it foremost among steel foundries in capacity and excellence of product.

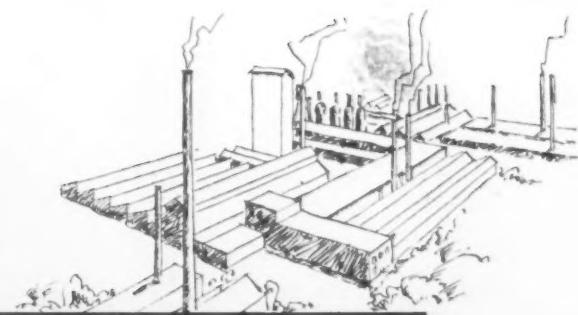
Located away from any large city, we have the undivided service of good railroad connections, insuring promptness in the delivery of our material and the shipping of our finished product.



Mill Pinion. 22' 3/4" long. Weight 121,220 pounds.

# STEEL CASTINGS

A shipment from the United Steel Foundry of just a few of the massive steel castings required for the World's



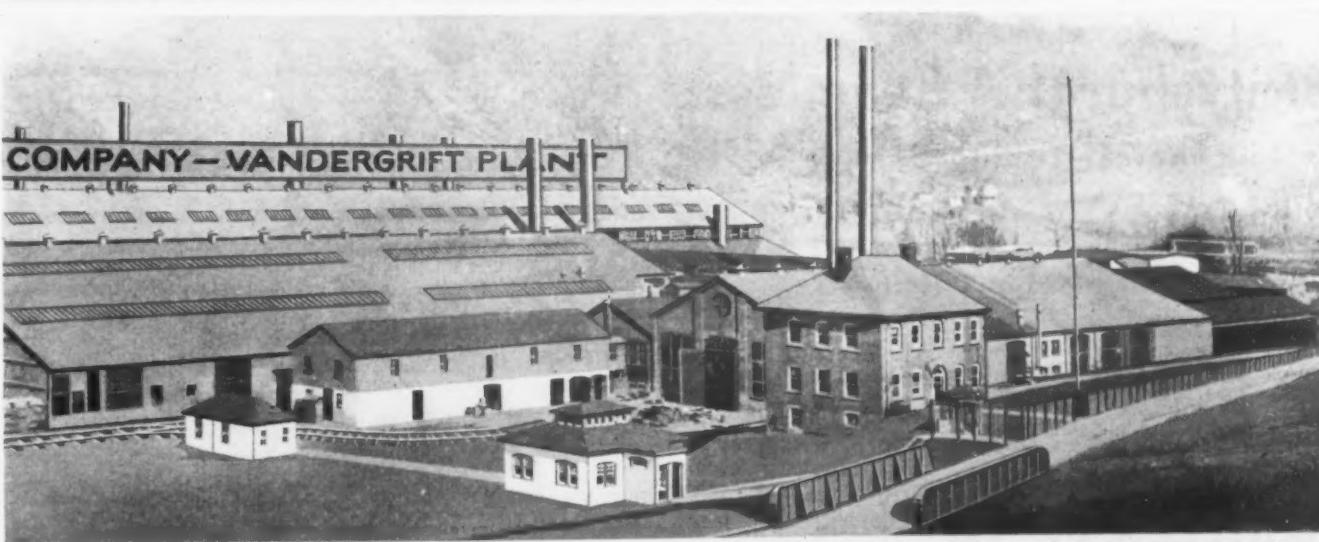
Largest Continuous Plate Mill, which is now being erected in United machine shops.



Hub for 21' 4" P. D. x 6' 3" F. Gear. Weight 82,100 pounds

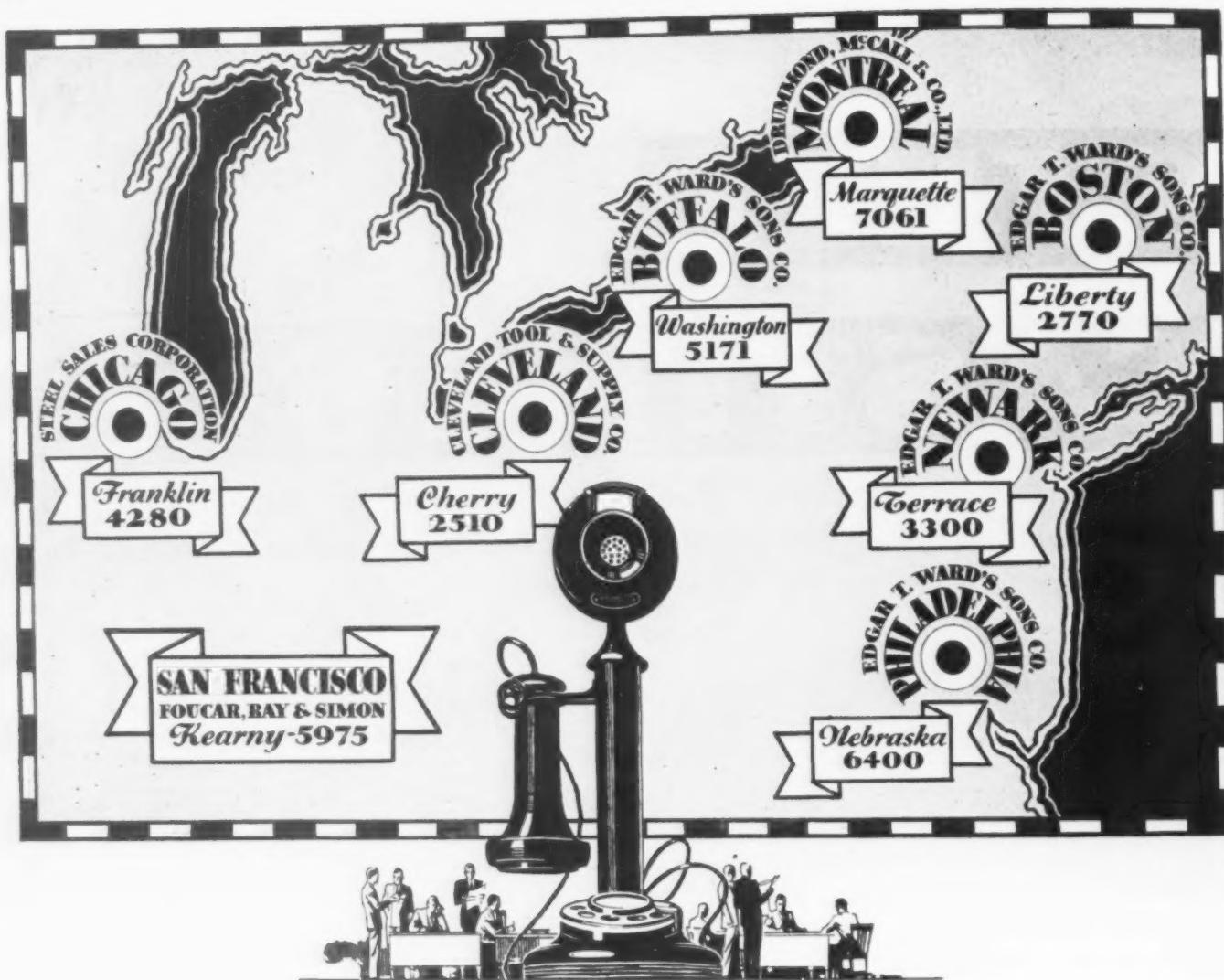


Shear Housing 15' 10 1/2" x 22' 2". Weight 151,100 pounds



**UNITED**  
ENGINEERING & FOUNDRY COMPANY  
PITTSBURGH, PENNSYLVANIA

October 2, 1930



## "Pittsburgh" Seamless

Mechanical Tubing Service is  
as Close as Your Phone . . .

Whether You Need a Pound  
or a Carload in a Hurry—  
Call Your Nearest Dealer.

Quick deliveries are assured by large stocks maintained by jobbers in the cities shown on the map above. Get acquainted with your local dealer for prompt service.

**Pittsburgh Steel Products Co.**

Pittsburgh  
New York  
St. Louis

Division of

Pittsburgh Steel Co.

Tulsa

Detroit  
Chicago  
Houston

BOSTON—Edgar T. Ward's Sons Company—50 Farnsworth Street,  
Telephone LIBERTY 2770.

BUFFALO—Edgar T. Ward's Sons Company—39 River Street, Telephone WASHINGTON 5171.

CHICAGO—Steel Sales Corporation—129 South Jefferson Street,  
Telephone FRANKLIN 4280.

CLEVELAND—Cleveland Tool and Supply Company—1473 West Sixth  
Street, Telephone CHERRY 2510.

MONTREAL—Drummond, McCall & Company, Ltd.—930 Wellington  
Street, Telephone MARQUETTE 7061.

NEWARK—Edgar T. Ward's Sons Company—400 Frelinghuysen Avenue,  
Telephone TERRACE 3300.

PHILADELPHIA—Edgar T. Ward's Sons Company—Cedar and Westmoreland Streets, Telephone NEBRASKA 6400.

PITTSBURGH—Pittsburgh Steel Products Company—Union Trust Building, Telephone ATLANTIC 4760.

SAN FRANCISCO—Foucar, Ray & Simon—512 Folsom Street,  
Telephone KEARNY 5975.

**Pittsburgh** **Seamless**  
MECHANICAL TUBING

**"Save  
with Steel"**

# INLAND

## Increases Savings from Steel

**"Galvanized  
Sheets Protect"**

I

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**INLAND  
OPEN HEARTH  
STEEL**

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**INLAND  
Copper-Alloy  
STEEL**

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Steel is a superior material for thousands of purposes.

Inland strives to help steel users and Industry generally by supporting all constructive efforts to educate the public to the advantages and correct uses of steel in its many different forms.

But Inland goes further. By research work, by service—Inland *increases savings from steel*.

Our vast resources are applied without stint to the problems of improving steel as a material for Industry's use . . . of producing a better steel for each application . . . of helping Inland users save more for themselves and for their customers by building up an adequate and reliable source of supply for the Central West.

Standardize on Inland . . . increase, protect your savings from steel.

**"Steel  
Insures Strength  
and  
Security"**

I

**"Reinforced Concrete  
Economical—Enduring"**

I

# INLAND STEEL COMPANY

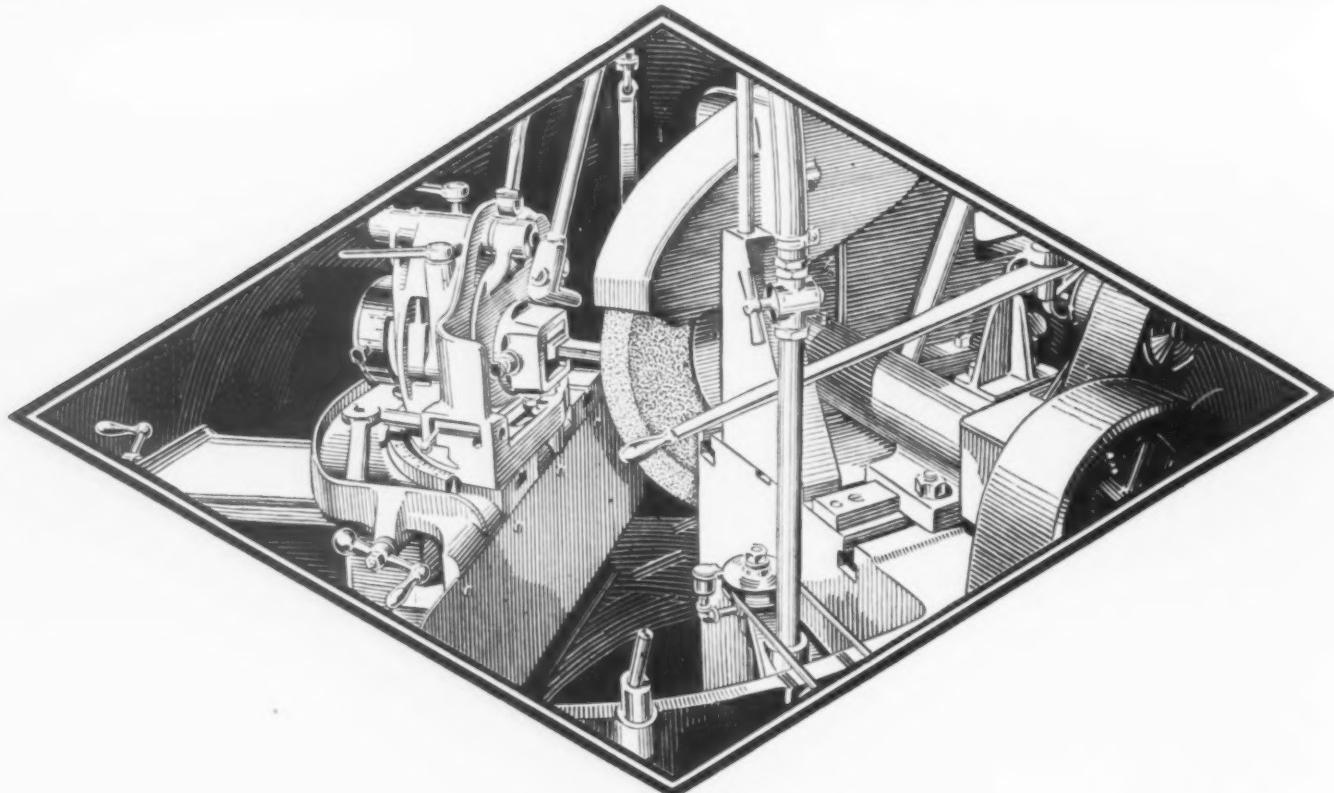


38 SOUTH DEARBORN STREET, CHICAGO

---

SHEETS, BANDS, BARS, STRUCTURALS, PLATES, RIVETS, RAILS, TRACK ACCESSORIES, BILLETS

---



## TOOL STEEL GOES FARTHER *a Sellers + Quality*

Tool steel is expensive—don't waste it. The Sellers Tool Grinder automatically duplicates the exact required angles and shapes of cutting tools,

grinding away only the minimum amount of metal necessary to produce or restore the correct shapes. With the Sellers Tool Grinder, one operator grinds all tools in a centralized tool-room. Every grinding produces the maximum quality and quantity of work because the tool is right by formulae—not approximately so, according to each workman's individual opinion or skill. Standards are established and maintained. Production is speeded up because workmen remain at their machines. Rejections due to poorly ground tools are eliminated. Labor costs for grinding are minimized.

### WILLIAM SELLERS & COMPANY INCORPORATED

ESTABLISHED 1848

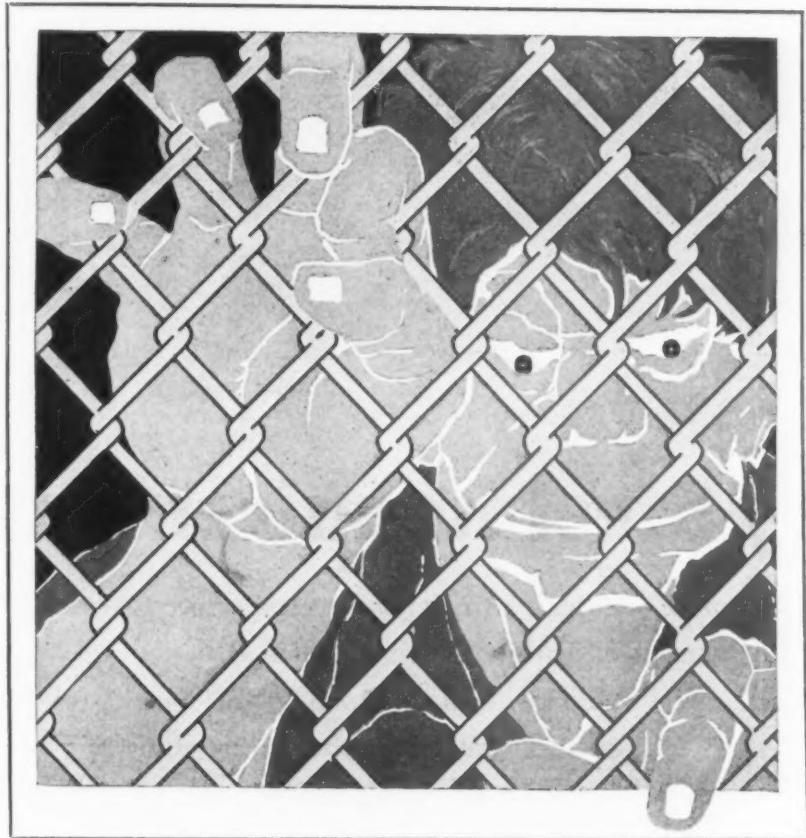
PHILADELPHIA, U.S.A.

Sellers Industrial Tools comprise Drill Grinders, Tool Grinders, Spiral Gear Drive Planers, Boring and Turning Mills, Floor Boring Machines, Planer Type Milling Machines, etc.

Sellers Railroad Tools comprise Car Wheel Lathes, Driving Wheel Lathes, Car Wheel Borers, Driving Box Borers. Also manufacturers of Sellers Locomotive Injectors.



# UNIFORM WIRE puts FENCE within the reach of ~



*Theft, vandalism, and arson are banished . . . a new respect for property rights comes into being . . . the entrance to and the exit from private properties are controlled . . . when protected by Wickwire Spencer Fence.*

**ALL  
INDUSTRY**



A NEW respect for property rights has come into being . . . ravages from arson, vandalism and destructive forces from without are thwarted and protected boundaries are the order of the day . . . Wickwire Spencer Chain Link Fence is within the financial reach of every industry.

The manufacture of Copper-Bearing Steel wire, so uniform as to permit its being woven on high speed looms, has brought this about. Galvanizing after weaving has made this fence rust proof and permanent.

The lifelong endeavor of this Company has been to produce the most uniform wire possible and the finest wire products. Years of costly research, strict adherence to scientific methods and the most modern type of plant and equipment have made this ambition a reality.

**WICKWIRE SPENCER  
MAKES UNIFORM**

Wire of all kinds  
Wire Rope  
Wire Reinforcing Fabric  
Clinton Wire Lath  
Wire Screen Cloth  
Wire Poultry Netting  
Chain Link Wire Fence  
Wire Springs & Spirals  
Wire Grilles & Cages  
Wire Diamond Mesh  
Perforated Metal Grilles  
Perforated Metal Screens  
Perforated Centrifugal  
Linings  
Wiseco Card Clothing  
Wiseco All Steel  
Radiator Furniture

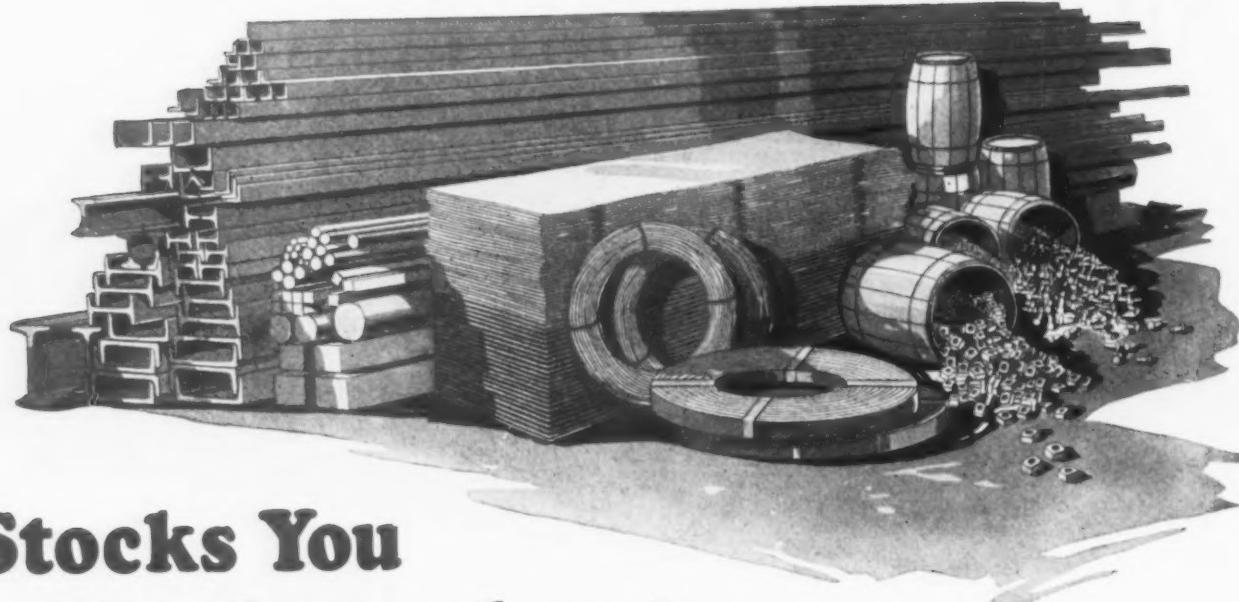
**WICKWIRE SPENCER STEEL CO.  
41 East 42nd Street New York City**

Worcester  
Buffalo  
Cleveland

Chicago  
Tulsa  
San Francisco

Los Angeles  
Seattle  
Portland

**WICKWIRE SPENCER**  
**W I R E   P R O D U C T S**



# Stocks You Can Depend on to Meet Every Steel Requirement

Steel in every shape and size—standard and special grades—more than 175,000 tons always in stock for immediate shipment.

No matter what your requirement—as to special product or emergency delivery—you can call on Ryerson with reasonable assurance that everything possible will

be done to meet your requirements well within the time specified.

There is a Ryerson plant near you. There is another near your branch or job. This permits distant as well as local buying to the best advantage. Order from the plant nearest you. Immediate shipment is assured.

*A few of the 1001 items in stock for immediate shipment*

Bars	Refined Iron	Boiler Tubes	Alloy Steel
Structurals	Turned Ground and	and Fittings	Tool Steel
Rails	Polishing Shafting	Welding Rod	Concrete Reinforcing
Plates	Screw Stock	Forging Bar	Firmtread Plates
Sheets, Blk. & Galv.	Strip Steel	Babbitt Metal	Small Tools
Sheets, Full Finished	Rivets and Bolts	Allegheny Metal	Machinery, etc.

*Write for the Ryerson Journal and Stock List—the "Key" to Immediate Steel*

**JOSEPH T. RYERSON & SON INC.**

*Plants:* Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City  
*Representation in:* Minneapolis, Rockford, Kansas City, Tulsa, Houston, Dallas, Newark,  
 New York, Denver, Los Angeles, San Francisco

# RYERSON

S T E E L - S E R V I C E

# THE IRON AGE

Contents for October 2, 1930

Metal Etching a Growing Art	905
Future of the Small Manufacturer	908
Management of a Small Plant	909
Quenching and Tempering Steel Castings	914
Annealing and Galvanizing Strip	918
Stools for Ingot Molds	920
Reclaiming Oil from Turnings	922
Machine Shop Accounting	925
Cold Rolling Machine Parts	928
Hardness Tables	932
Dr. Haney's Page	937
▲ ▲ ▲	
New Equipment	933
Editorials	938
Markets and News	941
Personals and Obituaries	962
Business as Others See It	976
▲ ▲ ▲	



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239 West 39th Street,  
New York, N. Y.

Cable Address: "Ironage, N. Y."

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## The Spotlight Is on These Two

BY men and by mail we call every week on thousands of manufacturers of metal products. We find that right now the two burning questions in the industry are:

1. When will business get better?
2. How can we cut our operating costs?

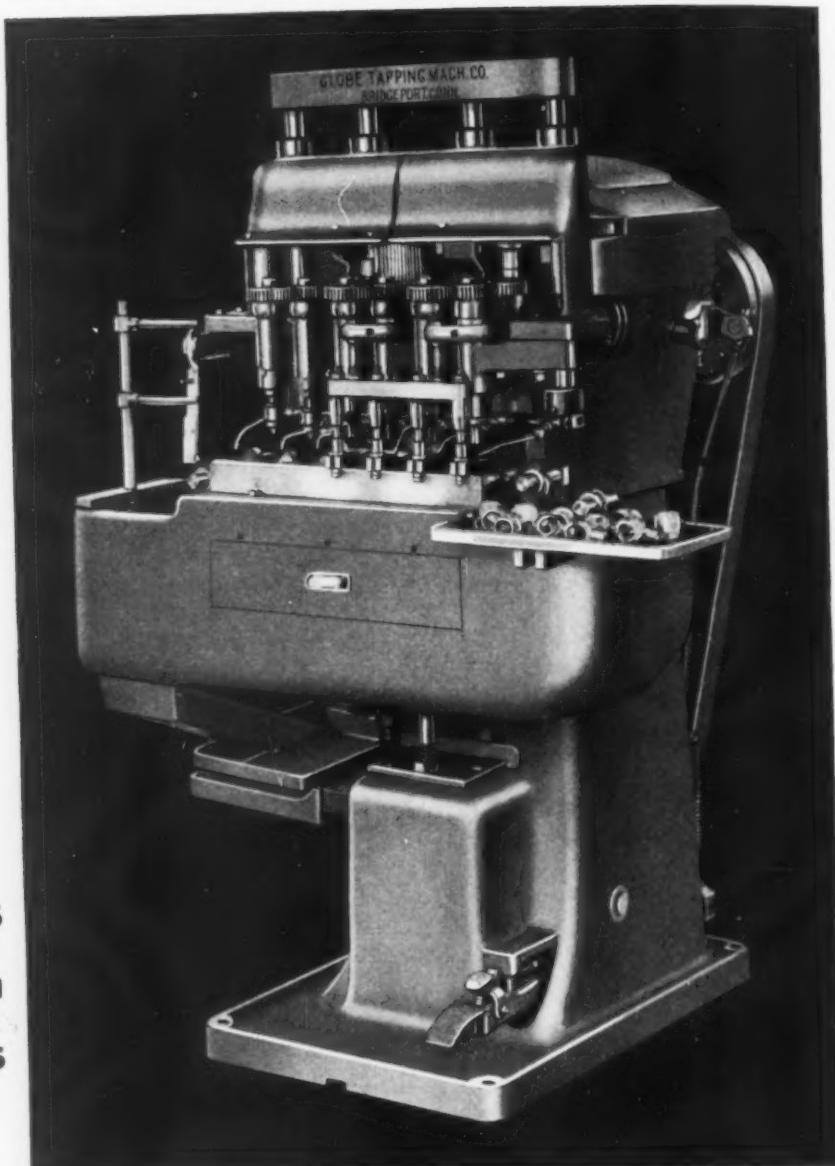
Mark how well THE IRON AGE answers them. The market reports tell who is buying, and how much. Dr. Haney studies statistics and tells us what they show for the future. THE IRON AGE gives you all the worth while trade statistics, so that you can do your own prognosticating if you care to. Our editorials discuss trade tendencies and interpret their significance.

The entire IRON AGE is an answer to the questions. The description of newly developed material or equipment (in the advertising or editorial pages) reports on production methods, a waste of elimination campaign, or a wage incentive system, or a production control plan—any one may mean a saving to you of hundreds of dollars, even more.—A. H. D., Reader Service Department.

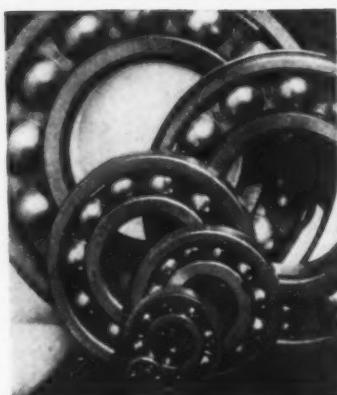


NOTHING ROLLS LIKE A BALL

**More records  
broken with  
New Departures**



The Globe Tapping Machine Company has just completed this special machine, of its own design, which drills 4 holes and taps 3 in an automobile part, at the rate of 25 pieces per minute. Spindles are rigid, sensitive, permanently accurate—free rolling on New Departure Ball Bearings. But all the attention was not lavished entirely on the more important parts, for New Departures are used all through the mechanism. It is a care-free machine . . . one capable of many years' performance with the least possible amount of trouble and upkeep expense. That is an outstanding characteristic of New Departure-equip-



**NEW DEPARTURE BALL BEARINGS**

# This Issue in Brief

**Etching of steel and non-ferrous metals** has developed into highly specialized industry which produces artistic results by a process resembling the engraver's art. Bronze bulletin boards, elevator door panels and other decorative architectural effects achieved in larger areas than have hitherto been called for.—Page 905.

\* \* \*

**The small plant is not out of the running**, says the president of the Sun Tube Corporation, Hillside, N. J., which produces an annual volume worth \$750,000 from a floor space of 7500 sq. ft. President Lynch declares that a small plant scientifically organized has the necessary essentials for competition with units of any size.—Page 908.

\* \* \*

**By quenching and tempering**, the best properties of either plain carbon or alloy steel castings can best be brought out. Author makes plea for such treatment, basing his argument on a series of tests, showing properties as cast, after annealing and after quenching and tempering.—Page 914.

\* \* \*

**Chicago strip steel plant** contains interesting installation, which anneals, cools, pickles, washes and galvanizes the strip continuously, automatically and at a high rate of speed.—Page 918.

\* \* \*

**Remarkable savings** are reported to have been made from the practice of making stools for ingot molds, used in pouring of large ingots, of alloy gray iron or alloy cast steel, proving that ingot mold stools are of nearly the same importance as regards economy and production as the mold itself.—Page 920.

**In a new patented process** put into operation at the Gambrinus plant of the Timken Roller Bearing Co. at Canton, Ohio, 6000 gal. of cutting oil is recovered daily from 120 tons of steel turnings.—Page 922.

\* \* \*

**By means of mechanical tabulation** many of the original shop records, such as time cards, clock-in-an-out cards, requisitions, etc., may be made to do double and triple duty in the machine shop. Many copying operations also may be eliminated, and the old payroll book may be discontinued.—Page 925.

\* \* \*

**Despite the business depression**, a maker of collapsible tubes has been running its plant 60 per cent ahead of last year. How does it do this? By a somewhat unusual sales policy, by development of competition between apparatus units, by incentives to indirect labor and other factors. It has only 10 customers and a "waiting list." Read "Squeezing Gold Out of Tin."—Page 909.

\* \* \*

**That cold rolling the surface** of machine parts raises the fatigue or endurance limit about 15 per cent is the conclusion from the results of torsion and bending fatigue tests on alloy steel at the Woehler Institute, Brunswick, Germany. Other tests have shown similar results with respect to copper, bronze and the light metal, Lautal.—Page 928.

\* \* \*

**Danger of quench cracks** in heat treatment of steel castings is eliminated by thorough refinement of metal before casting, by obtaining uniform temperature in piece to be treated, and attaining proper temperature for quenching operation.—Page 916.

**No incentives paid to direct labor** in New Jersey plant whose processes are largely automatic. All incentives are applied to indirect labor, which provides the brains and ability and shoulders the responsibility for output and quality. Development toward automatization tends to reduce proportion of direct labor.—Page 911.

\* \* \*

**Conveying system used in** Timken plant in reclaiming cutting oil from turnings. Turnings are sprayed with hot water, which is pumped to the washer under 85 lb. pressure at rate of 1000 gal. per min. Oil, water and fine turnings flow into a sump, where turnings sink to bottom and are later taken out with a magnet. Oil and water flow into settling tank, where oil rises to top and is skimmed off, then passed to a centrifugal cleaner.—Page 923.

\* \* \*

**Turnings, amounting to 120 tons a day**, produced in the plant of Timken Roller Bearing Co., are briquetted in 300-ton machines, after removal of cutting oil, and are charged in 25 lb. briquettes into open-hearth and electric furnaces.—Page 922.

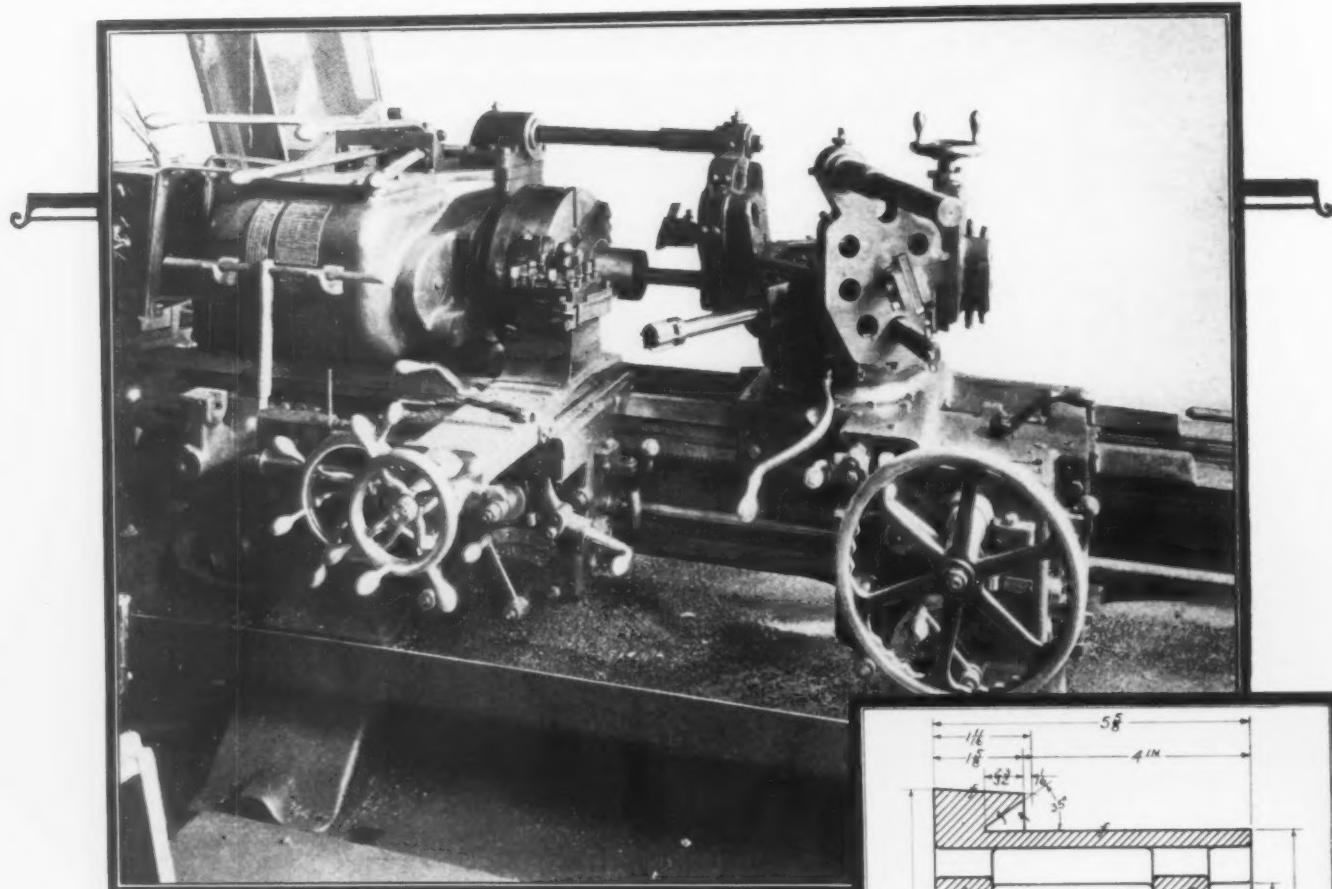
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**New hardness tables offered**, one for determining the hardness of sheet metal by the use of the 5-mm. ball when the material is too thin to test with a 10-mm. ball.—Page 932.

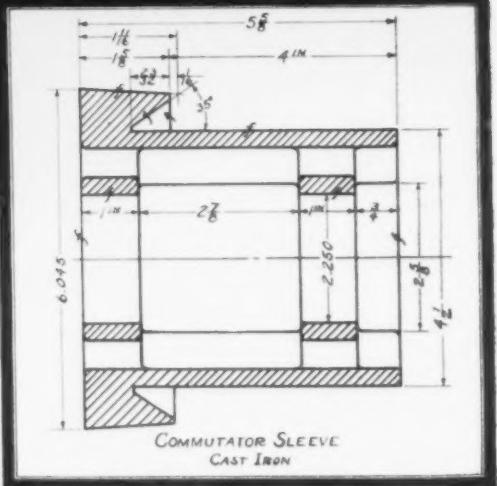
\* \* \*

**Few of the commercial alloy steel castings** on the market, author asserts, will, when annealed, exhibit properties comparable with 0.30 per cent carbon steels that have been properly quenched and tempered.—Page 915.

# It Pays to Replace Obsolete Turret Lathes with Modern W & S Machines



A prominent manufacturer of electric motors replaced two old type turret lathes with a new W & S 2-A machine, averaging a saving of 68% on three jobs previously done on the obsolete machines.



The photograph illustrates the set-up for one job--a commutator sleeve, on which the machining cost was reduced from 53c to 15c.

**The Warner & Swasey Company**  
Cleveland, Ohio, U. S. A.

# THE IRON AGE

New York, October 2, 1930

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VOL. 126, No. 14

## Metal Etching An Art Entering Into Wide Use

ETCHING metals such as brass, bronze, nickel silver, aluminum and its alloys, and more recently the high chrome nickel alloys of steel, has developed in the past few years into the handling of large decorative panels which would have amazed the artists of the fourteenth century, who first used the process of destroying metal to produce a design.

For the larger work, as well as in such products as identification plates, signs and clock and meter dials, the combination of camera, protective coatings and immersion in acid have replaced the etcher's pencil so that the original drawing of the architect or designer is accurately reproduced to the minutest detail.

Sensitized with a coating of albumen, a zinc sheet of about No. 5 to 7 gage is locked in a printing frame with the negative, and the design to be etched on the metal is transferred by the light of arc lamps to the surface of the sheet. On small and medium sized designs,

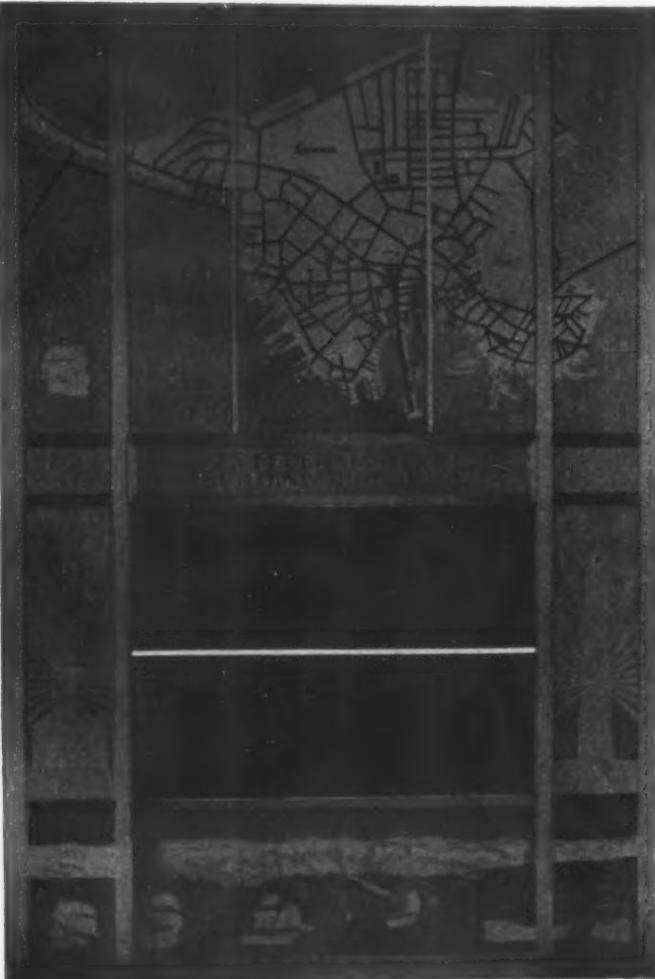
the camera provides the negative, but in handling a large panel, 2 or 3 ft. wide and 5 to 7 ft. long, special methods are required. The negative required is built up from large strips of transparent photographic film

on which the drawing to be reproduced is traced. The artists work on a glass-topped table, lighted underneath, tracing readily all the details of the original drawing.

While black ink is sometimes used for the purpose, the Etched Products Co., Long Island City, has found an opaque red particularly suitable, as it does not scale or chip when dry. The opaque red is also used by this company for retouching the negative, covering any pinholes or hairlines that may appear in the photographic film, when the camera is used.

### Special Frame for Large Panels

Large panels are placed in a vertical printing frame, which will accommodate sections up to 4 x 8 ft., while two arc lights print the negative on the sensitive zinc.



The bronze bulletin board in the main lobby of 75 Federal Street, Boston, demonstrates the intricacy of design which may be etched in metal

The smaller products moving along the regular line of production are usually placed in a horizontal frame with a sheet rubber backing, which may be inflated with an air pump, forcing the negative and zinc plate firmly together. With the smaller frames, a single arc lamp is usually sufficient.

When the zinc plate has had the required exposure, it is placed in a lithographic flat-bed cylinder press, or, in the case of 7-ft. panels for doors, in a newly-developed flat-bed transfer press, power operated. Here, the design on the zinc plate is printed with

metal is done, the plate is immersed in the etching vat and washed in a cleaning bath a number of times for 10 to 15 min., depending upon the metal and the depth of the design. The washing after the acid bath arrests the action of the acid. If permitted to remain in the vat too long the acid would tend to eat too deeply and undermine the design. The washing or cleaning solution used to suspend action of the etching acid usually consists of 1 lb. of sodium or potassium bichromate,  $\frac{3}{4}$  lb. of oil of vitriol (sulphuric acid) and 3  $\frac{1}{3}$  gal. of water.



asphalt ink on the metal to be etched.

The metal bearing the design is then dusted with one of various compounds used in providing a protective coating to the parts of the plate not intended to be eaten by the etching acid. Dragon's blood, rosin, beeswax and an acid are used in certain compounds and others are composed of beeswax, Gilsenite and an acid. Gilsenite is a brittle asphalt used in the form of a brown powder, which when warmed becomes plastic and provides protection against acid.

#### In Bath for Short Period

When the powder has been dusted on the plate and brushed off, except where it adheres to the ink on the design, the plate is passed through a furnace on a conveyor and the powder fuses with the ink, providing a strong protective surface for the design.

In the department where the actual etching of the

*These elevator door panels in the Richfield Oil Building, Los Angeles, were etched on ordinary furniture steel by the Etched Products Co., after which the fabricator of the doors, the A. J. Bayer Co., Los Angeles, had them nickel plated, with a satin finish*

The metal-removing acid used for the etching varies with each plant and with the metal being etched. The acids for brass, copper and zinc differ completely from those used on aluminum, ordinary cold-rolled steel, or the high chrome-nickel steels. Monel metal is

etched with a solution of nitric acid. For the steels and aluminum a usual solution for etching is perchloride of iron, obtained by adding soft iron borings or shavings to 480 lb. of muriatic acid until reaction ceases and ferrous chloride is obtained. To this saturated solution is added 60 lb. of nitric acid at 42 deg. Baumé and then 180 lb. of muriatic acid at 20 deg. Baumé. Hydrofluoric acid may be used for etching rustless or stainless steels, but its action is very rapid and the fumes are dangerous.

After etching, some of the metal remains in solution. This is precipitated by adding iron in the case of copper in the solution, or nitric acid when steel

has been etched. The solution is then reoxidized.

While certain etching shops find it more satisfactory to purchase their perchloride of iron ready for use, disposing of the acid when its usefulness is ended following a certain amount of etching, this practice is usually adopted by plants doing only a minor amount of metal etching. The Etched Products Co. has found by experience that compounding of its own solutions of perchloride of iron is more economical and with the necessary materials available the etching acid is left in the vats from day to day and rejuvenated by the addition of muriatic acid, soft iron borings or shavings and nitric acid.

With the etching completed to the required depth, the resistant inks are removed by washing the article in Vololine, a solvent of gasoline, after which it is thoroughly cleaned by immersion in sawdust to clean and dry the surface. Maple sawdust is widely used and oak is carefully avoided because of the tannic acid in the oak sawdust. As a final precaution against corrosion, all the etched metals, except high chrome-nickel steel, receive a lacquer finish, to preserve the metal from tarnish for various periods. Such protection is unnecessary with rustless steel. An exception to the lacquering method was a number of elevator door panels recently made by the Etched Products Co. for the Richfield Oil Building in Los Angeles. Ordinary furniture steel sheets were used and after being etched were nickel plated.



*Aluminum lends itself readily to etched designs. This door, entirely of aluminum, was fabricated by the United Metal Products Co., Canton, Ohio*

When coating with colors, rustless steel is treated similarly to the other metals. The part of the design not to be colored is covered with asphalt paint and the entire product is sprayed with the required lacquer. This adheres firmly to the uncoated portions of the metal and the asphalt painted sections as well, but

washing with a solvent of asphalt removes the coated asphalt sections and leaves the lacquer only where it is adhering directly to the metal.

If a two-color design is required, the second application is made after covering parts of the design with tape, leaving exposed only the parts to be colored. This

is done before the final washing off of the asphalt paint.

The lacquers used give a heavy enameled surface, which offers considerable resistance to the normal wear occasioned by necessary polishing of the raised metal portions of a design. Proponents of high chrome nickel alloy steels claim that this polishing and wear on the lacquered background of a panel is greatly reduced with the corrosion resistant alloy.

If no color is to be used, it is customary to oxidize or change part of the background of the design to a tone of gray with lead acetate, which brings out the design more strongly. This oxidation is sometimes used in combination with the sprayed lacquers, providing the effect of an additional color in the design.

While modern decoration has brought the metal etcher to the fore as an important contributor to the attractiveness of the lobbies in the great business and apartment structures of today, the future promises him a still more important place. Now it is the doors, bulletin boards or special panels for the interior, which are etched and colorfully lacquered. In the not distant future, however, with metal being increasingly used for exterior decoration,

and all-metal faced structures seriously considered, the etched panel for exterior use on and near the street level appears to offer an additional demand for the work of the etcher in metals able to handle large individual pieces.



## Is the Small Plant Out of the Running?

"No," says F. J. LYNCH, president of the Sun Tube Corp., of Hillside, N. J., and he ought to know, because his plant is turning out an annual volume in excess of \$750,000 from a total plant area of 7500 sq. ft.

"Too much capital is worse than too little, because dollars cannot take the place of brains. Too much room in a plant encourages waste of materials and motions. There is no place in our plant where one could swing a cat around his head if he had any regard for the cat.

"A small plant scientifically organized, with the proper experience in the field and with a good development department, has the necessary essentials for successful competition with units of any size.

"A small organization is in close contact with its market, supervision is more immediate and personal, ability can be quickly determined, and mistakes recti-

fied promptly. By offering the proper incentives, results can be secured against any competition.

"In the last analysis, one skilled workman is comparable with another, as is a skilled engineer or executive. Performance is dependent on intelligent effort and the specialist in the small plant has nothing to fear from the big organization."

\* \* \*

In the following article, Mr. Lynch describes some unique and effective methods of organization and operation that have been applied in his plant.

# Squeezing Gold Out of Tin

By F. J. LYNCH

*President,  
Sun Tube Corporation*

I HAVE been asked to tell the readers of THE IRON AGE something about our methods of management and organization. The question put to me to answer is this, "What factors have enabled you to keep running full time on a three-shift basis all through the business depression?"

First let me say that our industry as a whole is not prospering. The consumption of collapsible tubes for tooth paste and shaving cream is, to put it mildly, no better this year than last. In running 50 per cent better than last year in production volume, as we are, we have been characterized as being fortunate. If fortunate means being lucky we must disclaim this term. Luck does not play much of a part in a highly competitive industry.

There are a number of different factors which have combined to keep our plant going to capacity. No one of them alone would have been capable of doing it, but properly hooked up to pull in unison, they have produced unusual results.

The more important of these factors are as follows:

- 1—*A rigid product standardization*
- 2—*A somewhat unusual sales policy*
- 3—*Disregard of fixed ideas in production engineering*
- 4—*Development of competition between apparatus units*
- 5—*A radical obsolescence policy*
- 6—*Incentives to indirect labor*
- 7—*Extension of executive responsibility*

Take factor No. 1, rigid product standardi-

zation. We make four sizes of tubes only. This is to the customer's advantage as well as ours, since it enables us to serve him more rapidly and economically than if our plant were cluttered up with a confusion of different sizes. Also, of course, from our own operating standpoint, this is a great asset. Specials are "out." If a customer wants us to serve him, he must take what we offer. This is not a sales handicap; on the contrary, I have found it to be a help.

Carrying the idea a bit further, we insist on minimum requirements from our customers of 3 days work on a unit, or 1000 gross of tubes. We do not believe in small lots as "overhead carriers." The best overhead carrier is a steady production quota of big lot business. Operating on this policy we have been able to carry an average booking of orders for two years ahead, with some running to five years. We sell our customers on the sound idea that long term business of this kind enables us to make investment in improved equipment and in development work in which they share the benefits of cost reduction or quality improvement. Short term contracts would not give them this advantage.

Operating on this sales principle, which is based on sound production practice, enables us to sell our product without employing salesmen. We operate with less than ten accounts and usually have a waiting list.

Another production factor which forms a strong selling point is a quick production cycle. Ours is 50 min. from raw material to crated

**H**ERE is a company that does not recognize the word "depression."

Its production is running 60 per cent ahead of last year, in an industry which, as a whole, is not exceeding last year's volume.

It is operating three shifts full time, and has been doing so ever since the stock market crash.

It has increased wages of skilled help within the last sixty days, pays 53 weeks salary for 51 weeks work and gives ten-day vacations.

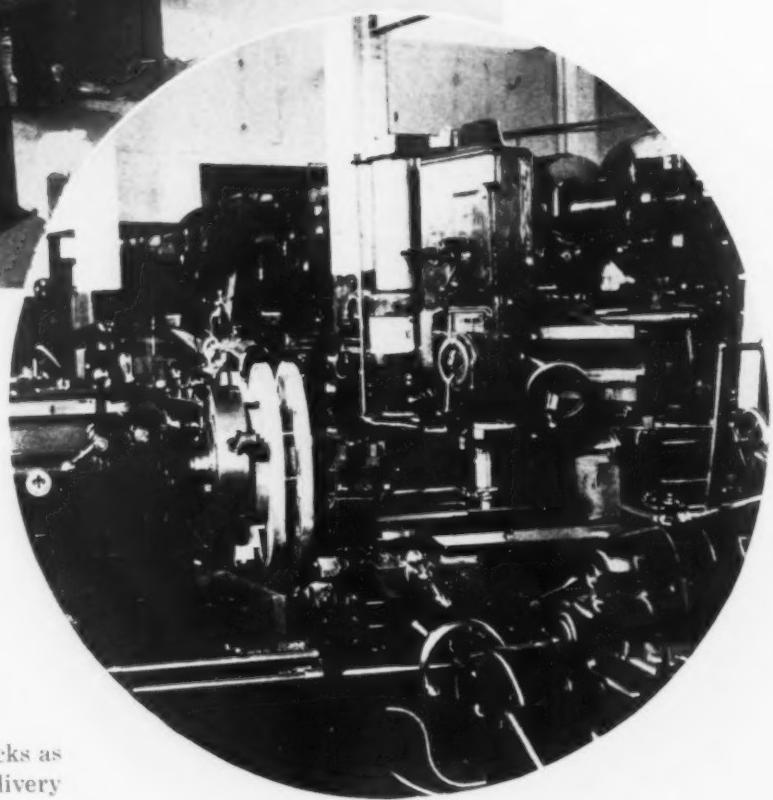
It has orders booked for five years in advance, with an average booking of two years ahead.

Its machine replacement policy is such that in four years the obsolescence account has equalled twice the capital stock value.

It makes collapsible tubes for tooth paste and shaving cream, using special production machinery throughout the process, yet standard machine tools constitute one-third of its total equipment.

Its methods of management and its operating policies are so unique that we have invited Mr. Lynch to tell us about them.

**JOHN H. VAN DEVENTER,**  
*Industrial Consultant—THE IRON AGE*



*APPROXIMATELY 33 per cent of all of the equipment of the plant is represented by machine tools, in spite of the fact that no machine tools are employed in production. Capacity for immediate repairs, tool making and machine construction are considerations responsible for this condition*

finished product. This reduces our customer's stocks as well as our own because we can always make delivery in short order when called for. We aim to hold our finished inventory as not to exceed one and one half hours' production, and generally succeed in so doing.

We fight against the deadening influence of precedent in our production through the instrumentality of aggressive development work. Every one of our principal men is taught to keep his mind open for new ideas. A large part of the energy of the organization goes into the development of new apparatus. That is the reason why we, who do not use machine tools at all in our process of making tubes, nevertheless operate a machine shop which represents about one-third of our entire equipment investment. Of course, in addition to building our own machines and tools and dies, we use this for making repairs also. Minutes count when continuous production is concerned.

We believe in making machines compete with one another as well as men. Therefore we have no one way to make our product. Instead, we have three different processes or production units, as we call them in operation at the same time. One of these is what we call the specialized automatic unit, another is the semi-specialized automatic; the third is a variable

automatic. Each of these hook-ups has certain advantages. The winning group, or unit, over a period sufficiently long to be a fair test, will make the other two obsolete.

This policy has led to some rather unusual ideas concerning obsolescence. In the past four years our equipment replacement account has amounted to twice our capitalization. Our machines do not get time to wear out under these circumstances. They are thrown out.

We believe in minimum plant and maximum production. When there is too much room in the plant, wastes creep in that are difficult to locate and eliminate. Our machine spacing is very close. We utilize not only floor space but overhead air space as well. Our conveyor system makes it possible to do this effectively. Motor drive on most of our equipment does away with overhead belts and makes the overhead drying oven system feasible. The same square foot of floor space that serves an extrusion press or an automatic printing unit also serves a drying oven. There is no place

in our plant where one could comfortably swing a cat around his head, if he had any regard for the cat.

As a result of this intensive use of floor space and overhead area, we are able to complete and ship a valuation of product of about \$750,000 per annum from a total floor area of 7500 sq. ft. This area includes receiving and shipping departments, office and engineering departments, toolroom and machine shop as well as production units.

Our organization is such as to emphasize the value of indirect labor as contrasted with direct labor. We employ machine operators, of course, who fall in the latter category. Their work however is mainly restricted to pressing buttons on machine control apparatus. It is our particular purpose to devise machines and methods which will make the product mechanically perfect insofar as this is humanly possible. We have a system of inspection which gives a check up on each operation at 30 min. intervals. But the machine operators do not function in this.

We have little confidence in the ability of unskilled labor to differentiate between good and bad quality, and indeed,

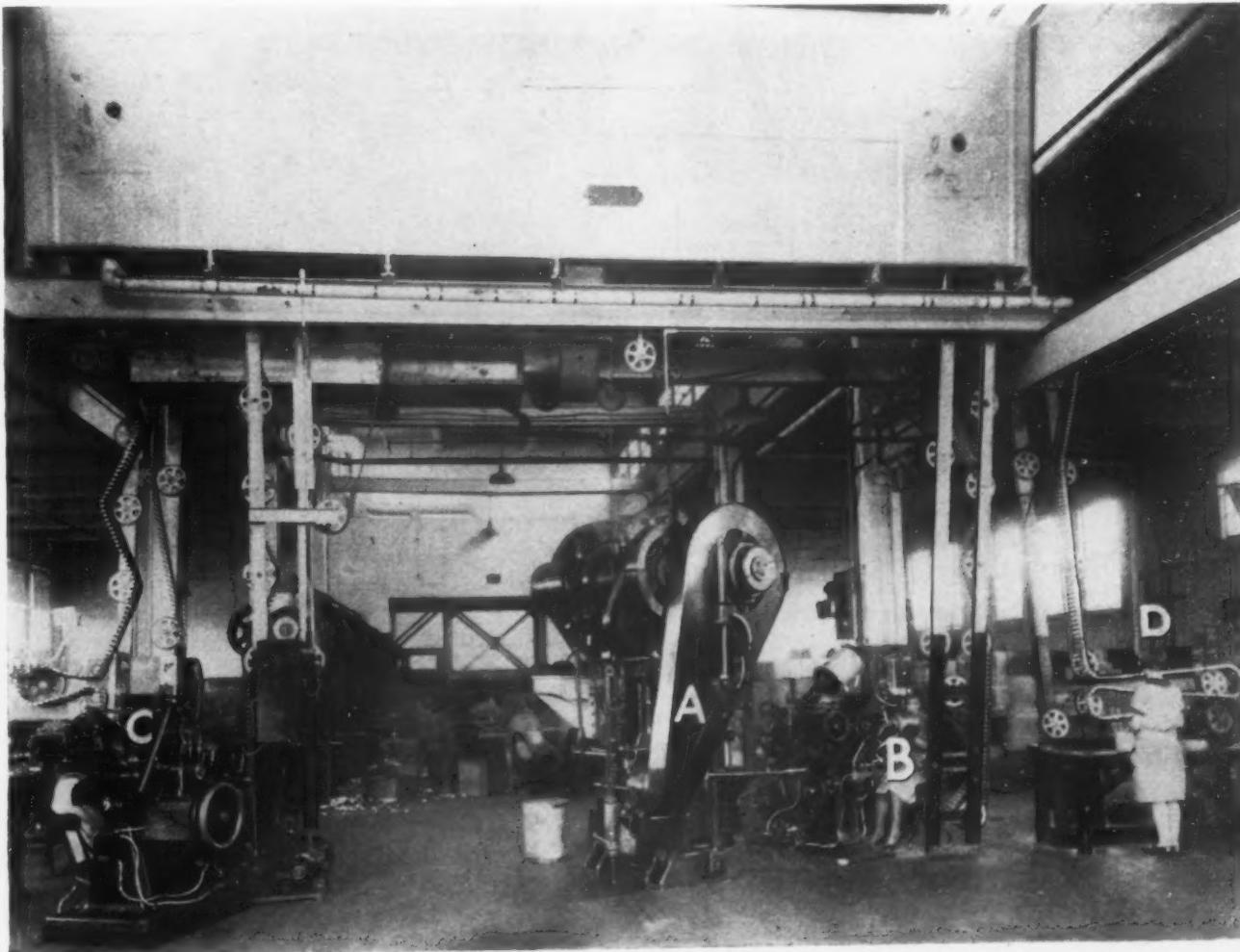
very little confidence in the value of unskilled help. Therefore all of our incentives are applied to indirect labor which provides the brains and initiative and shoulders the responsibility for output and quality. Our development toward automatization tends to continually reduce the proportion of direct labor. Four or five girls now take care of a unit of output which formerly required fifteen.

We pay our direct labor straight day wages, basing them on the prevailing rate in the district and raising them periodically at fixed intervals for two years, at which time the maximum is reached. No incentives are paid to direct labor.

Before telling about our incentive plan for indirect labor, I must sketch an outline of our organization.

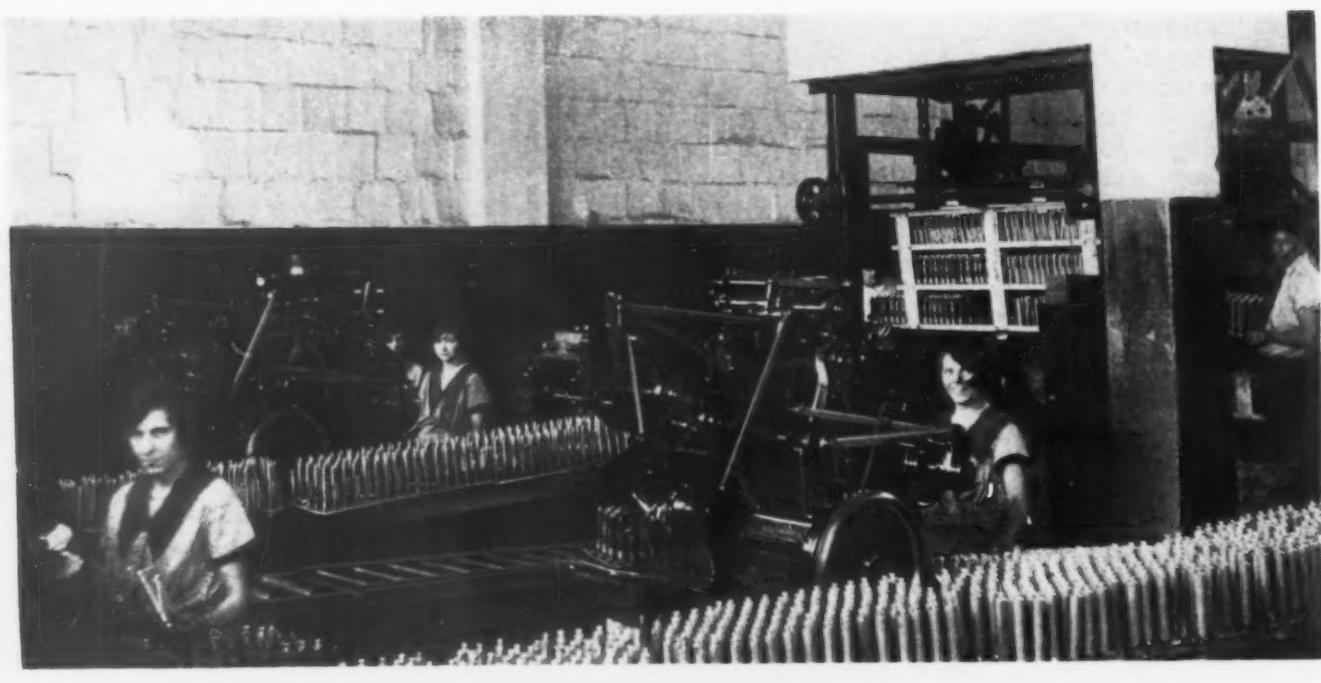
The chief operating executive is trained as a tool maker and machine designer. The vice-president in charge of engineering is also an ex-tool maker and machine designer. So also are his two assistants. Any one of these principal men can perform any operation, if necessary, either in construction or operation. There are two groups of

*ONE of the automatic units for making collapsible tin tubes. A, shows the extrusion operation. The tubes feeding by conveyor into automatic machine B, wherein neck is threaded, tube is trimmed to length, cap with the cork inserted is screwed on to tube. Coating, ejection of tube and scrap, follow in turn. They are then elevated by conveyor into a Y oven, and dried. They next come down to printing unit C, label is printed, and pass into the other leg of Y oven and dried, descending to unit D for crating. Fifty minutes from tin slug to crated tube, ready for shipment.*



indirect labor emanating from this central supervisory group. Each of them is in charge of an engineer, his assistant and a junior. Each of these men also can, in emergency, do any work that may be necessary in connection with machine failure. Assistants and juniors are trained to perform the functions of their principals. Our overtime shifts are supervised by them, which not only develops them in shouldering responsibility but also gives us practically no overhead

Every increase of 500 gross during a period of 22 days calls for a 25 per cent increase in this bonus, and the establishment of the next regular bonus based on the 500 gross increase. As a result of this system, we have attained an actual production of 72 per cent of the theoretical capacity of the plant. Our method of compensation enables a good man to earn as much as \$4,000 a year, and the more he earns, the better we like it.



**MACHINES** and processes compete for survival. This semi-automatic printing unit is competing with the full automatic unit shown at C in Fig. 1. The winner will make the loser obsolete

**A SYSTEM** is employed of developing juniors for every important principal. Chief Engineer John H. Friden and his junior

on these shifts, since this same organization would be employed if we ran but one.

One of the two indirect groups or divisions referred to above consists of tube mechanics who build the tools and control the operations on the automatic extrusion units. The other group or division is detailed to the work of machine construction and improvement.

The men in these two groups, forming our indirect labor, are the bonus men in production. They are also paid a salary of 53 weeks per year for 51 weeks work. This allows for a ten-day vacation, with pay, which comes annually the week preceding Labor Day. In addition, a bonus is paid them when the quota of production established on a machine-minute basis is equalled.

When the men in this first division or group have idle time on their hands, they aid the construction mechanics in the second division. This is in line with the principle of flexibility which we develop to the utmost.

In line with this versatility, an instance may be cited. Recently, the president, chief engineer and production superintendent were forced, through an accident, to remain away from the plant for some days. The juniors moved up the line, took over supervision automatically, and production went on as usual, in fact a record was broken.

The bonus plan is a stimulus toward this sort of cooperative effort, and carries it all along the line.

If a man fails to report for a shift, he notifies his junior, who functions for him. In production such as ours, and particularly on three shifts, dependability is essential. Every important man is taught to be an executive. He can procure raw material, provide shipping facilities or take care of any item necessary for production.

These are some of the factors which have been of service in keeping our plant busy. They have enabled us to give the kind of service and the quality of product that maintains consumer demand in bad times as well as good.

### Half-Million-Volt X-Rays

X-RAYS at 500,000 volts, more than twice as high a voltage as is being used in today's most powerful therapy tubes, have been attained by Dr. W. D. Coolidge, associate director of the General Electric research laboratory at Schenectady. Such a decided increase in voltage, and hence increase in penetrating power of the rays, was made possible by a system of "cascading" the tube, an arrangement devised by Doctor Coolidge in his work with high-voltage cathode-ray tubes.

Doctor Coolidge has announced that another X-ray



**H**IGHLY skilled die maker engraving the die for marking the shoulder of a tube.

The assistant chief engineer (below) inspecting a remarkable automatic machine. This feeds tube into the machine, cuts the thread, cuts a cork for the cap, corks a cap, caps a tube, ejects the trim scrap, cuts up the cork scrap, coats tube with lacquer, ejects the cork scrap and ejects the coated tube. It stops and starts on remote control.

tube is being developed, to operate at 900,000 volts. The 500,000-volt X-ray tube is built in two sections.

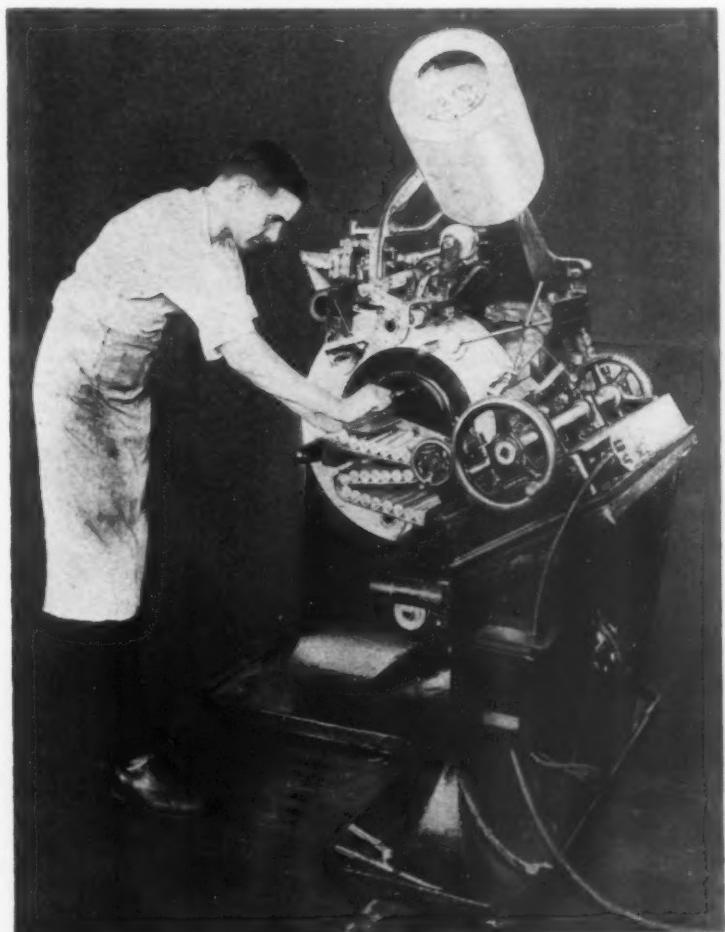
In his previous work in cathode-ray tube development he found that tubes can be built for very high voltages by the use of a cascade (or sectional) system, and that by this method there appears to be no limit to the voltage which can be used. The target replaces the "window" of the ca-

thode-ray tube so that, instead of cathode rays being emitted by the tube through such a "window," X-rays of exceedingly high penetrability are generated by the impact of the electrons (or cathode rays) on the target.

At present the highest-voltage Coolidge X-ray tubes used commercially are of 200,000 volts peak capacity. These are of two types—water-cooled and air-cooled. Both are adaptable for X-ray therapy. The air-cooled type has been used to considerable advantage in industrial applications of X-rays, since the high voltage gives the necessary penetration required for examining the heavier metal objects. Industrially, higher voltages would permit radiography of thicker metals, and would shorten time of exposure.

### Instruments for Measuring Surface Temperatures

**I**T is much more difficult to measure the temperature of a surface, such as that of a hot stove, than that of a liquid or of the air in a room. There are times when it is necessary to measure the temperature of a hot surface, such as that of a piece of metal which is being heated, or of a heated roll, used in drying paper. The October number of the Bureau of Standards *Journal of Research* contains a description of instruments which have been used successfully in measurements of this kind.



# Getting the Most Out of Steel Castings

By H. A. MITCHELL

Chief Metallurgist, Bonney-Floyd Co.,  
Columbus, Ohio

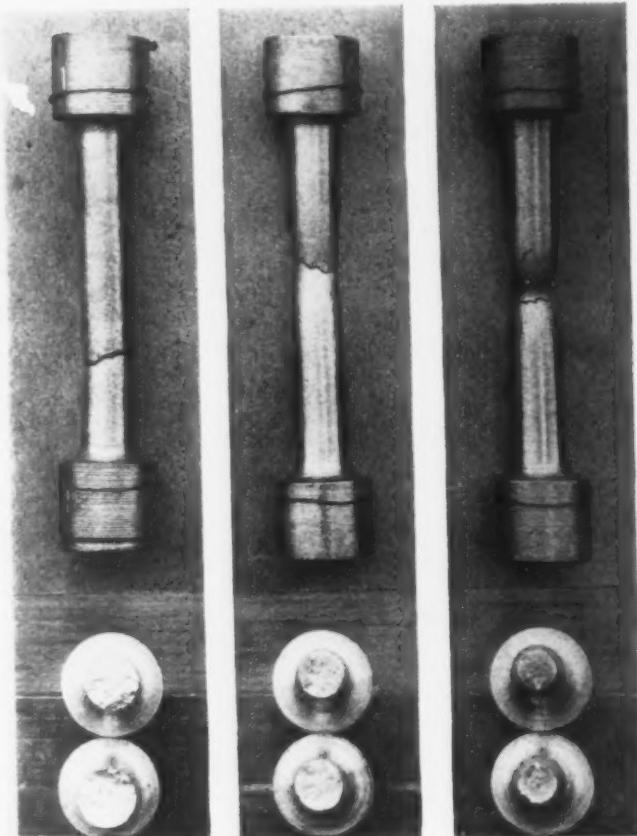
SINCE the birth of the steel casting industry there has been a natural evolution in the improvement of methods, processes and equipment for the production of this commodity but the inherent qualities, for example, of a mild steel casting of today are not widely different from a corresponding one of the early converter days. By proper heat treatment, however, the properties of such a casting can be remarkably improved. It is true that we have entered an era of alloy steels and with them has come a corresponding increased value to the consumer but, where at all possible, both alloy and plain carbon steel castings should be heat treated by quenching and drawing to give the fullest value in physical properties.

## Quenched and Tempered Castings Advocated

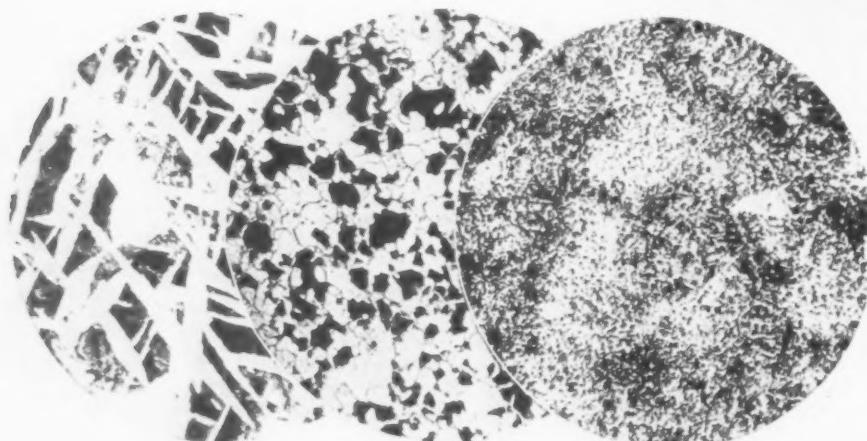
Heat treated plain carbon steel has properties equal or superior to many types of annealed alloy steel castings. By heat treatment is meant a quench in some liquid medium from a temperature above the critical range followed by a tempering at some temperature below that point depending upon the use to which the particular casting is to be put. This treatment applies to the common carbon steels as well as the more expensive alloy steels.

This method of heat treating should not be confused

with normalizing (air-cooling) or normalizing and drawing for such treatment, although an improvement over ordinary annealing, falls quite short of the re-



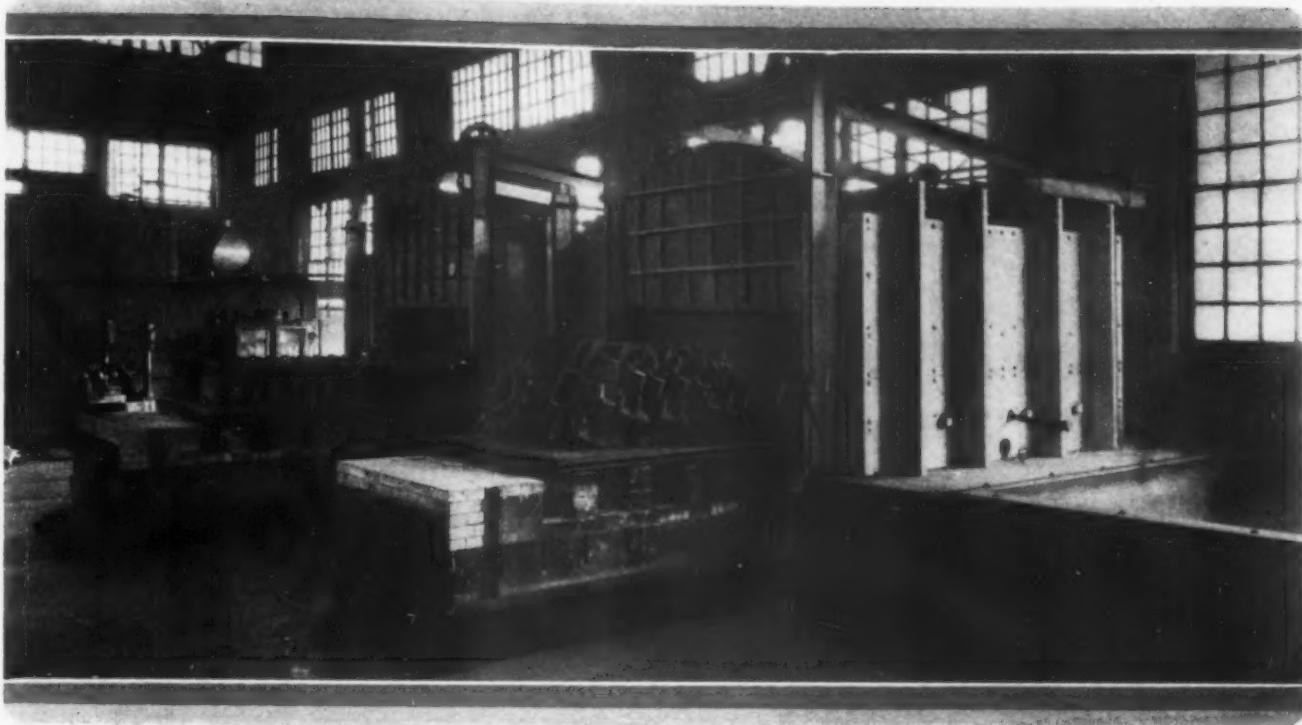
From left to right are shown test bars and photomicrographs of unannealed, annealed and heat-treated carbon steel castings. The physical values are also given for each. Magnifications are of 100 diameters.



Ultimate strength.....	74,800	75,650	84,200
Yield point.....	37,500	42,000	57,400
Elongation in 2 in., per cent.....	19.5	25.5	31.5
Reduction of area, per cent.....	29.0	44.0	65.0
Brinell.....	156.0	143.0	160.0
Izod.....	17.0	21.0	44.0
Endurance ratio.....	0.40	0.44	0.50
Analysis:			
C—0.30	Mn—0.79	P—0.030	S—0.026
			Si—0.33

sults obtained through heat treating by quenching in a liquid medium followed by a draw treatment.

When the first steel castings were made, they were used just as they came from the mold without any subsequent reheating. As soon as some of the progressive users became aware that annealing would



*One of the several heat-treating units, including quenching tank*

make their castings more useful, the demand was made that such be done and quite often in those days a hot ladle served as the annealer. Today the unannealed casting is a rarity and as soon as the buyer of castings realizes that the step from annealing to heat treatment imparts far more improvement than the step from the unannealed to the annealed state, the annealed steel casting will also become a rarity.

#### Effect of Various Heat Treatments

For comparison, take a 0.30 per cent carbon steel casting. This casting, after going through the normal procedure of being allowed to cool in the sand mold will have physical properties of the values shown in column one of table on page 917. After annealing, these properties will be as shown in column 2 and by quenching and tempering the same casting we may obtain the spread of properties as shown in column 3.

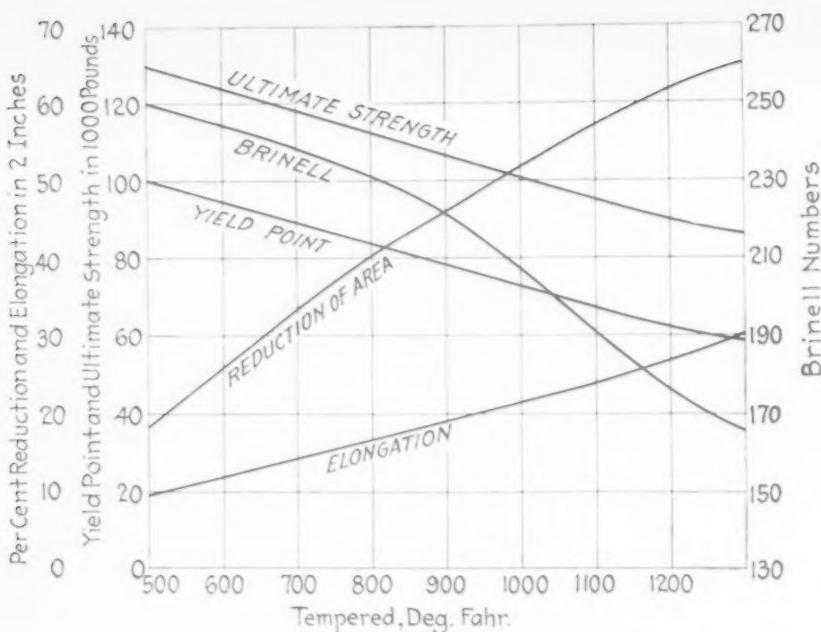
The results shown in this table are the average of 80 tests made from 0.30 carbon basic open-hearth and acidelectric steel heats and vary only slightly in analysis. All tests were taken from 1½-in. sq. bars and were annealed or heat treated as such and subsequently machined. Tension test

specimens together with photomicrographs and test results of three typical bars are reproduced.

Let us compare the improvement from the unannealed to the annealed and to the heat-treated state as evidenced by results shown with the photomicrographs. The heat-treated casting in this case is a typical one to replace the formerly annealed casting, having been quenched in water from 1650 deg. Fahr. and tempered at 1300 deg. Fahr. The percentage changes are based on the unannealed results as unity. We observe the improvements in table on page 917.

It is to be especially noted that the Brinell hardness in this case is increased 17 points over the annealed condition and yet the machinability is even better due to uniformity of structure. This fact is borne out by machine shop tests on a production basis.

**B**Y "heat-treated" steel castings the author of this article means quenching and tempering as distinguished from annealing. It is claimed that the best properties of either plain carbon or alloy steel castings can be brought out only by quenching and tempering. He makes a strong plea for such treatment and states that it is no more logical for the consumer to avail himself of only part of the potential value of the steel casting by using it in the annealed condition than it is to operate a machine tool at reduced capacity when full capacity is available. Type of casting is no hindrance if proper equipment is available and if rules which he suggests are followed.



*How the properties of carbon steel castings are affected by tempering*

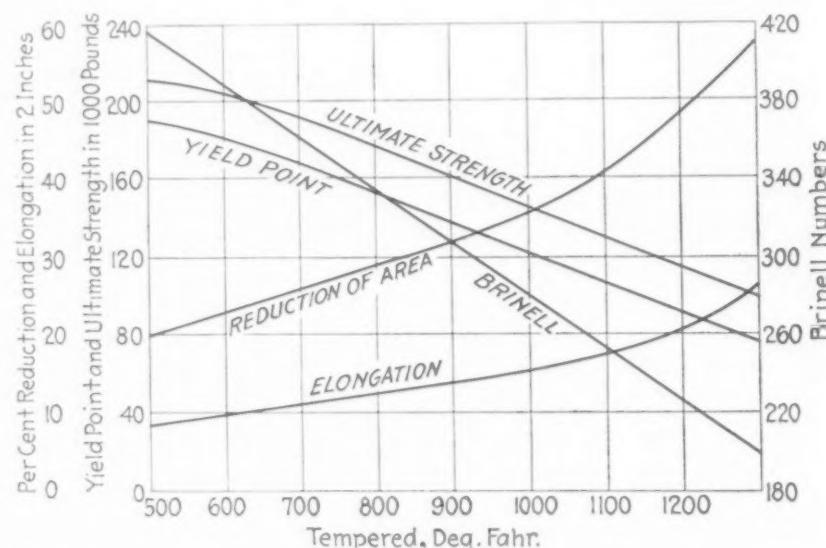
are few of the commercial alloy steel castings on the market which, when merely annealed, will exhibit properties comparable with the heat-treated 0.30 carbon steels in the table. Charts showing properties of typical heat-treated carbon and alloy steel castings are also reproduced.

The reader may question the hazards connected with or the advisability of quenching large and intricate castings or those with much variation in section. In answer to this we contend that with proper equipment, control and skill in handling, the type of casting need not be feared. For example, at the Bonney-Floyd Co., Columbus, Ohio, with which the writer is connected, there is no limitation as to size or

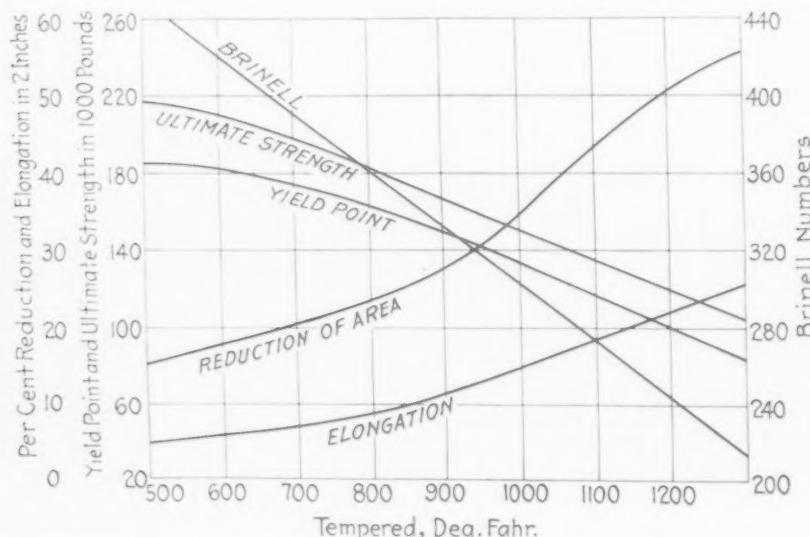
type of casting to be quenched except as the size is limited by the furnace equipment.

Danger of quench cracks is eliminated by observing a few important rules. First, the metal must be thoroughly refined before casting, which point applies especially to the harder types of alloy steels. Second, the charge or casting to be quenched must be absolutely uniform in temperature and, of course, the proper temperature previously determined for that particular analysis. Third, the temperature to which castings are quenched is very important.

To obtain satisfactory results day in and day out, it is necessary to have first-class equipment and absolute temperature control. One illustration shows one of several heat-treating units at the Bonney-Floyd Co. These particular units



*How the properties of nickel-molybdenum alloy steel castings are affected by tempering*



*Properties of nickel-chrome-molybdenum alloy steel castings as affected by tempering*

accommodate a casting or rack of castings having outside dimensions of 3 ft. by 5 ft. by 9 ft. One of the two furnaces is used for hardening and the other for tempering but may be used interchangeably.

The entire furnace, as well as the car top, is well insulated, thus insuring the least possible heat loss. It is fired with natural gas and equipped with automatic recording temperature control. Complete combustion, together with a non-oxidizing atmosphere, is obtained by a combination of proportional mixers and efficient burners. Due also to design of furnace and car, a circulation of hot gases is produced and a uniform temperature maintained. The door hoist and car puller are

remote controlled and may be operated either from the floor or from the overhead crane cage.

All parts operate so smoothly that the maximum time consumed for opening the door, pulling the car and immersing the load in the quench tank immediately adjacent is 50 sec. In this way the outer

parts of the charge have the least possible time to air-cool and corresponding uniform results are obtained. The racks upon which the work is loaded are handled by an overhead traveling crane, the hoist of which is equipped with a device which automatically grasps the rack when lowered. The output of one of the units as illustrated is about 16 tons of castings per 24 hr.

Any given type of steel casting in the annealed state shows practically the same physical properties regardless of its method of manufacture. The chief

TABLE OF PROPERTIES OF A PLAIN CARBON STEEL CASTING—  
AVERAGE OF 80 TESTS

	As Cast	Annealed	Heat-treated
Ultimate strength, lb. per sq. in.	74100	75000	80000 to 125000
Yield point, lb. per sq. in.	37100	41500	50000 to 97000
Elongation in 2 in. per cent	19.5	24.5	30 to 10
Reduction of area, per cent	31.0	46.2	65 to 20
Brinell	160	145	155 to 250
Izod	16	20	48 to 15
Endurance ratio	0.40	0.44	0.50

CHANGES RESULTING FROM ANNEALING AND HEAT TREATING.  
UNANNEALED USED AS UNITY

	Per Cent Change, Annealed	Per Cent Change, Heat-Treated
Ultimate strength.....	+ 1.1	+ 12.6
Yield point.....	+12.0	+ 53.8
Elongation .....	+30.8	+ 61.5
Reduction .....	+51.7	+124.1
Brinell .....	- 8.3	+ 2.5
Izod .....	+23.5	+158.8
Endurance ratio.....	+10.0	+ 25.0

difference between one casting and another depends on the care observed in molding and core making, heading and gating. By heat treating, however, the properties are so changed that the applications are multiplied many times.

It seems no more logical for the consumer to avail himself of only part of the potential value of the steel

casting by using it in the annealed state than it is to operate a machine tool at reduced capacity when full capacity is available. The value of scientific heat treatment for forgings was very early recognized by the automotive and other industries whose products were obliged to withstand high and repeated stresses.

It is here predicted that much the same enthusiasm will be shown for heat treatment by users of steel castings just as soon as they realize the greatly increased value that is imparted by this process.

THE Otis Steel Co., Cleveland, made the single steel casting here shown. It weighs 230,000 lb. and is 13 ft. long and nearly 7 ft. high. It will be an anvil base for a 12,000-lb. hammer being manufactured by the Alliance Machine Co., Alliance, Ohio, for the Taylor Forge & Iron Co., Chicago. The casting required six weeks in the foundry and three weeks for machining.



# Strip Steel Annealed, Galvanized

**A**T the Riverdale works of the Acme Steel Co., Chicago, the main building contains a continuous hot strip mill and three batteries of box annealing furnaces. Other buildings contain hoop mill, merchant mill, cold mills and galvanizing plant. Heating and rolling equipment were described in THE IRON AGE of March 20, 1930, page 846.

One of the most interesting features in this plant is an installation which takes the strip steel and anneals, cools, pickles, washes and galvanizes it con-

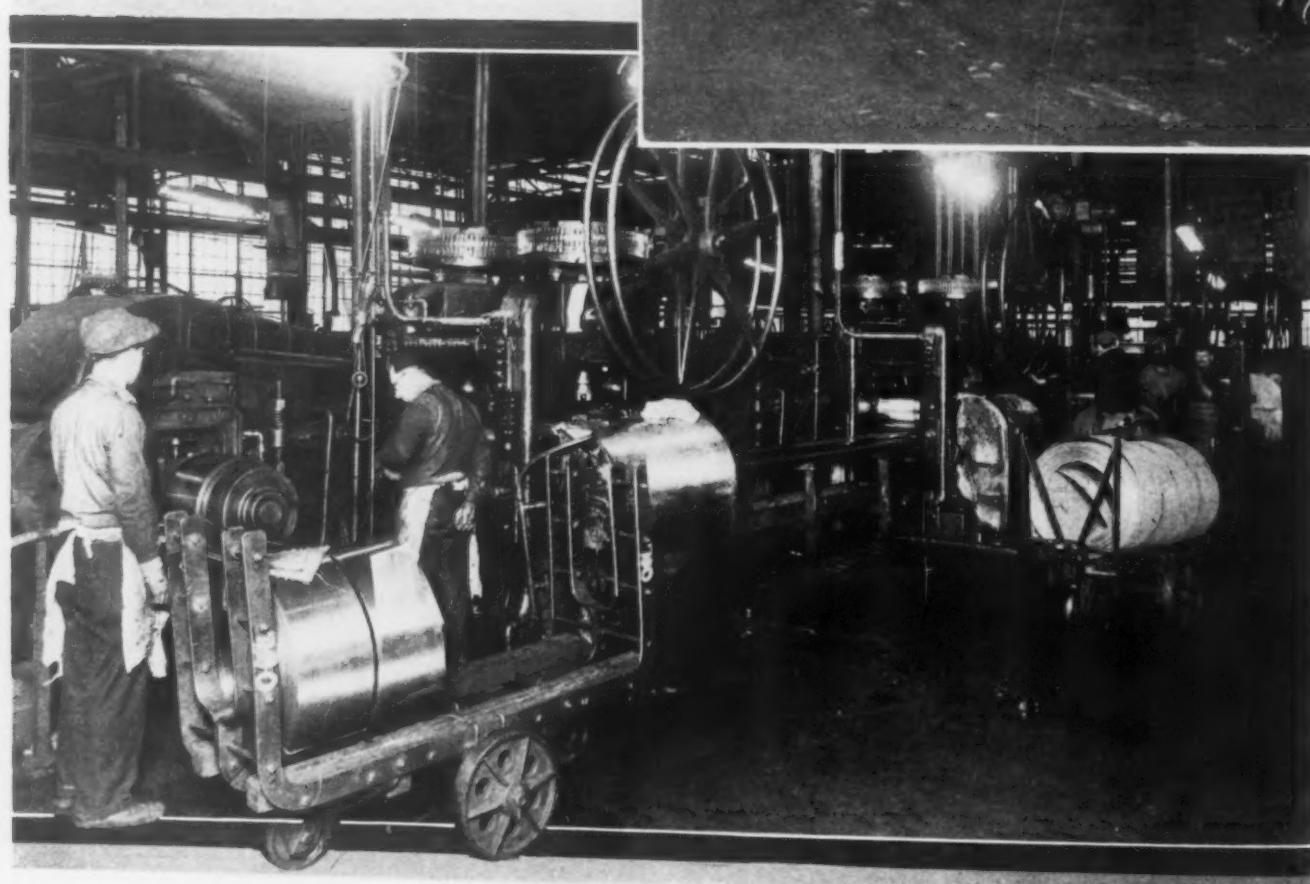
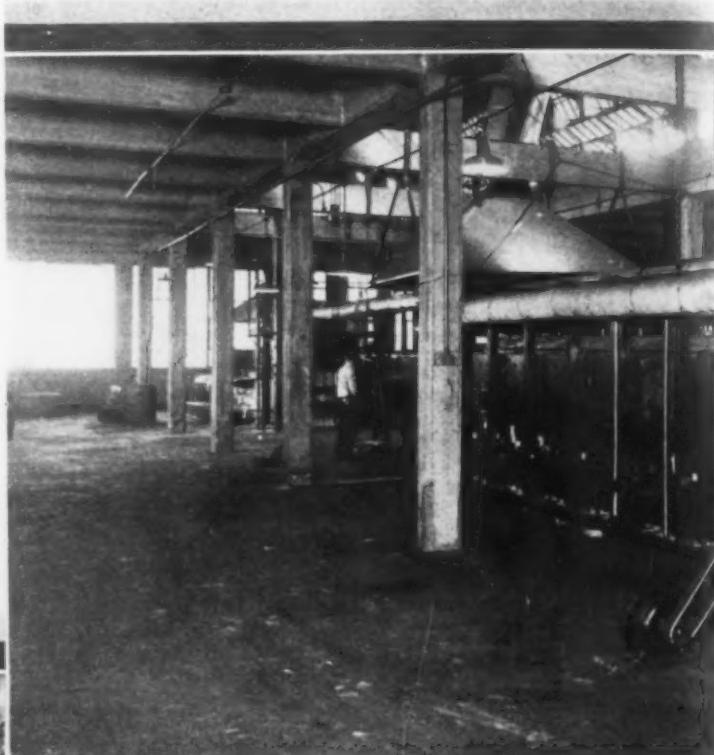
tinuously, automatically and at a high rate of speed. This installation sets on two floors and there are 18 reels for the coiled strip to unwind from, which are located on the second floor.

From these the strands of strip run through a gas-fired lead pot, where they are annealed. This pot or kettle is in reality a shallow pan of cast steel, 15 ft. long.

**C**ONTINUOUS Japan or paint baking furnace (at right) taking its product from lead annealing furnace in background. Strip steel passes through gas-filled horizontal pipes above furnace; thence through the paint bath, through wipers, through the furnace and to the floor below, to be coiled for shipment.

**Coiler** (below) taking strip as it comes from the finishing stand.

**Continuous gas-fired lead annealing furnaces** (next page) with temperature controls.



# and Japanned Continuously . . .

4 ft. wide and 6 in. deep. It is fixed in a brick setting which acts as a furnace and is 19 ft. long, 6½ ft. wide and 4 ft. high. The furnace is steel incased and has seven tunnel-type gas burners located in two groups on the sides.

One long manifold serves the two groups of burners on one end of the furnace, those on the other end be-

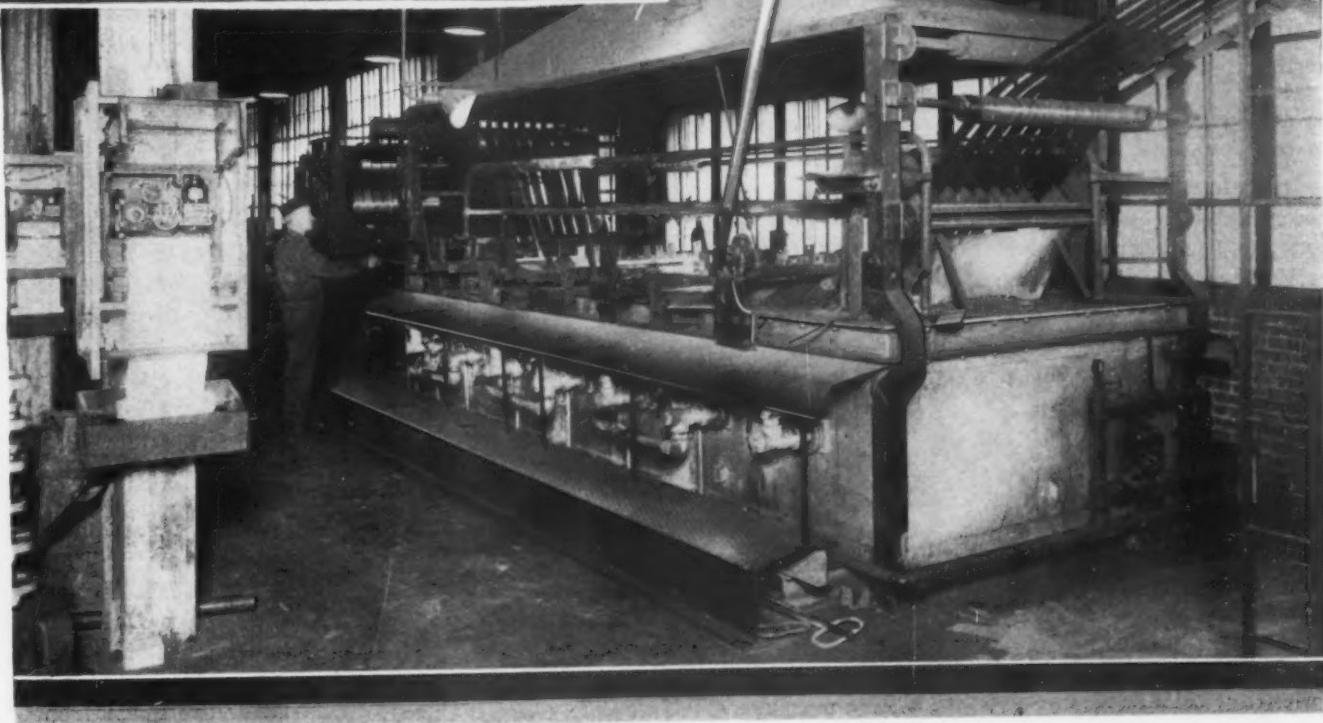
By J. B. NEALEY  
*American Gas Association,  
New York*

ing served similarly. To each burner is attached an inspirator or gas-air proportioner. The temperature of the lead bath is controlled with two automatic controllers each with a thermocouple in the bath and a recording pyrometer which gives a chart of the temperatures.

#### Lead Bath Can Handle Strips to Total of 36 In. Wide

This pan will hold 7½ tons of lead and a thin coating of coal screenings is used on top of the molten bath as insulation against heat radiation and slagging. Work up to 12 in. in width can be annealed in this pan, but the total width of all the work running through at one time must not exceed 36 in. The speed of the reels is so regulated that the work may travel through the bath at speeds varying from 8 to 50 ft. a minute. Another and similar set-up in this plant is used with an installation for japanning the work.

(Concluded on page 975)



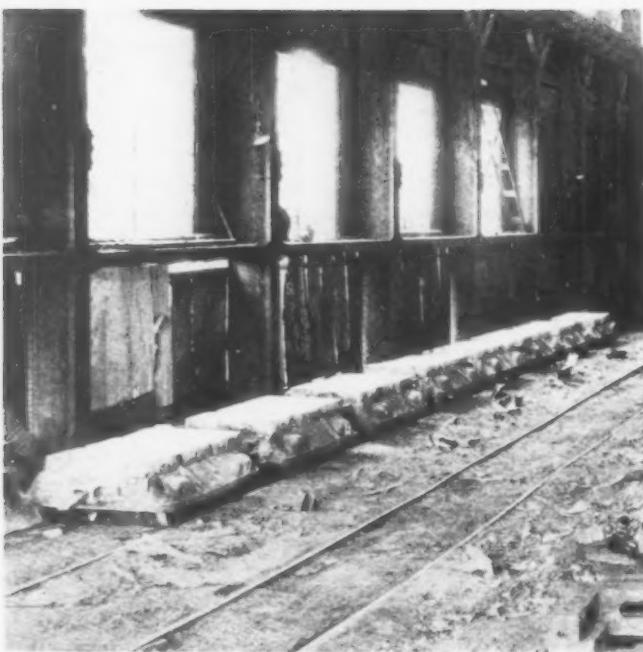


Fig. 3—*Ingot Mold Stools Used for Top Pouring of Ordinary Ingots. Stools Are Mounted on Ingot Cars*

WHILE, in the commonly applied top pouring of ingots, the molds under normal conditions are merely exposed to thermochemical deterioration and while strictly mechanical effects are confined to a more or less static pressure and comparatively negligible friction between the slowly rising metal and the wall of the mold, the conditions for the mold stools are quite different. A stream of molten metal of a high specific mass falls from 6 to 20 ft. and even more under pressure of the steel in the ladle, first "hitting" the stool directly and subsequently eroding the stool metal at temperatures from 2550 deg. Fahr. upward. During the filling of the mold, the stool metal is naturally attacked chemically. These reactions are undoubtedly increased by the high pressure or weight of the solidifying ingot against the mold stool.

While, however, in judiciously used ingot molds the pressure against the mold walls virtually decreases during solidification, the weight of the metal upon the supporting stool remains in most cases a practical constant. The counteracting taper of the wall might relieve these stresses somewhat but, from actual observations, this influence does not seem to be of vital importance. This fact, contrary to the rules of hydraulics or statics, has been repeatedly noticed, especially when pouring larger ingots from the bottom.

In one instance, molds and stools designed for bottom pouring were intentionally made from

## Cast Iron or Steel Stools for Ingot Molds

By JOHN H. HRUSKA

*Metallurgical Engineer,  
Berwyn, Ill.*

the same heat or ladle of both direct Bessemer iron and cupola melted metal. The behavior of both molds and corresponding stools was carefully checked after each heat teemed. Maximum mold erosion has been observed at about two-thirds of the height of each mold, but a still more pronounced deterioration was discernible at the whole upper surface of the stool where, contrary to top pouring, the effects of the impact of molten steel may be disregarded.

Besides the influence of continuous pressure of the ingot against the stool, a quicker thermal deterioration seems to accompany the above mentioned effects, thus even affecting the surface hardness of the stool metal. Hence, the tendency of some American, European and Asian steel works to specify entirely different metals for stools as compared with the corresponding molds.

### Alloy Iron or Steel for Stools

So far, it appears to be the cheapest practice to make stools and molds from identical iron or identical heats. When analyzing the life of really useful stools in comparison with molds, one is often surprised as to the discrepancies and variations of similar observations. Perhaps the closer attention given to this matter in connection with better steel, lessened delays, speedier stripping and other items may account for the fact that instead of the well known routine to use identical iron for molds and stools, the latter are made from

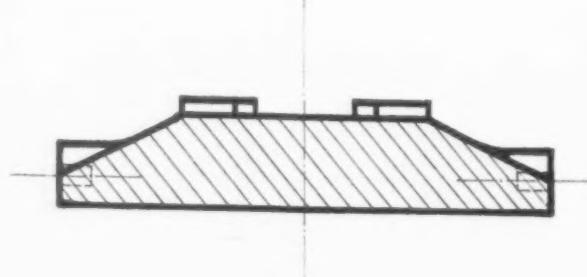


Fig. 1—*Ingot Mold Stool Used for Top Pouring of Ordinary Ingots. Material: Cast Iron*

either alloy gray iron or lately from alloy cast steel.

In many plants remarkable savings have been experienced due to this practice. In order to abbreviate a detailed description of these metals used in various plants and countries, the table on page 975 presents a summary of the iron used as stool metals.

Judging from this compilation, it is evident that the higher price to be paid for the stool metal is favorably balanced by a much longer service of the stools, which in turn decreases scrapping costs, labor, turnover of materials, clerical work, etc. With this in mind, many executives with vision realize the possibility of real savings by introducing better and more reliable materials for ingot mold stools.

#### Thermochemical Deterioration and Life of Stools

While in teeming and cooling, the chemical reactions between the stool metal and ingot steel are undoubtedly very much alike as between the mold wall and ingot, there has been noticed a marked increase in the speed of surface reactions between stool and solidifying steel. The surface layer of the oxidized or decomposed metal is in many instances 30 to 80 per cent deeper as compared with the corresponding ingot mold wall. The results of a detailed study of these conditions are to be reported later in another article.

Structural changes of the stool metal are accompanied by changes in shape or cross-section of the stool. All these influences tend to affect the usefulness of the stool to a varying extent. Consequently, much discussion is being devoted to settle the question of how long a stool should be used to the advantage of the plant or works as a whole. The decision is quite easy for the time of scrapping of ingot molds; the first "sticker" due to rough or locally eroded interior is an unfailing sign for discarding the mold.

It is somewhat different with stools. If a stool does not crack, it is frequently being put into production a manifold of the number of heats per corresponding mold. However, the question arises whether the increased continuous discard of uneven ingot bottoms is not more costly than a new stool with at least a fairly smooth top. Figures in several plants proved the fallacy of the apparent savings derived from many a "long-life" stool.

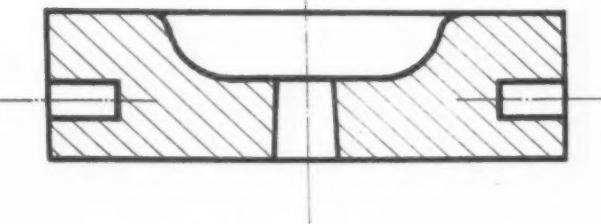


Fig. 2.—Ingot Mold Stool Used in Bottom Pouring of Large Ingots. Material: Cast Iron or Cast Steel

In many instances, reports are rendered to plant managers showing 100 to 500 per cent higher numbers of heats per stool than the corresponding molds. This fact may appear in favor of the steel producing departments, but does not balance with the normal output of the rolling mill, forge shop or the plant as a whole. Especially, in those establishments producing higher priced alloy steels, this practice is very costly and should be investigated without prejudice to this or that department.

#### Design of Mold Stools Important

Since their inception, very little changes were made in the design of mold stools. Ordinarily, a stool is a heavy metal plate with suitable lugs, holes or cast-in hooks for convenient lifting. If the molds are to be placed on the teeming floor (stationary teeming) the stool is supported by rails or beams set into the floor; if the molds are filled while on buggies, the transverse cross-section of the stool is designed for a statically more favorable purpose. However, almost every plant has a certain type to which not only foundry, but also steel works executives have adhered frequently for many decades—perhaps even without reason.

Although the principles of the stool design seem to be extremely simple, there are several expectations which define to a considerable extent the future economy of the stool casting. Probably the most important feature is the proper consideration of the central overheating of the stool in each filling of the mold. The repeated heating and cooling of the center of the stool causes, quite often, transverse cracks from the outside portion of the stool plate toward the geometrical center of each ingot support. Similar causes of a decrease of the life of stools may be remedied by a redesign of the stool in accordance with these suggestions.

Lugs and other means for lifting should be provided for in places as far as possible away from the center of the molds or stools. The frequent shop routine, in certain quality works, of transporting the ingots with molds and stools into cooling pits, necessitates designs which make the safest and quickest attachment to the lifting crane possible. From the author's observations in many steel works in the United

**L**ATELY stools for molds are being made of alloy gray iron or alloy cast steel. Remarkable savings are reported from this practice.

**Q** Data prove the fallacy of the apparent savings derived from "long-life" stools.

**Q** Most important feature in the design of stools is proper consideration of the central overheating of the stool in filling the mold.

**Q** Ingot mold stools today are of nearly the same importance as regards economy and production as the mold itself.

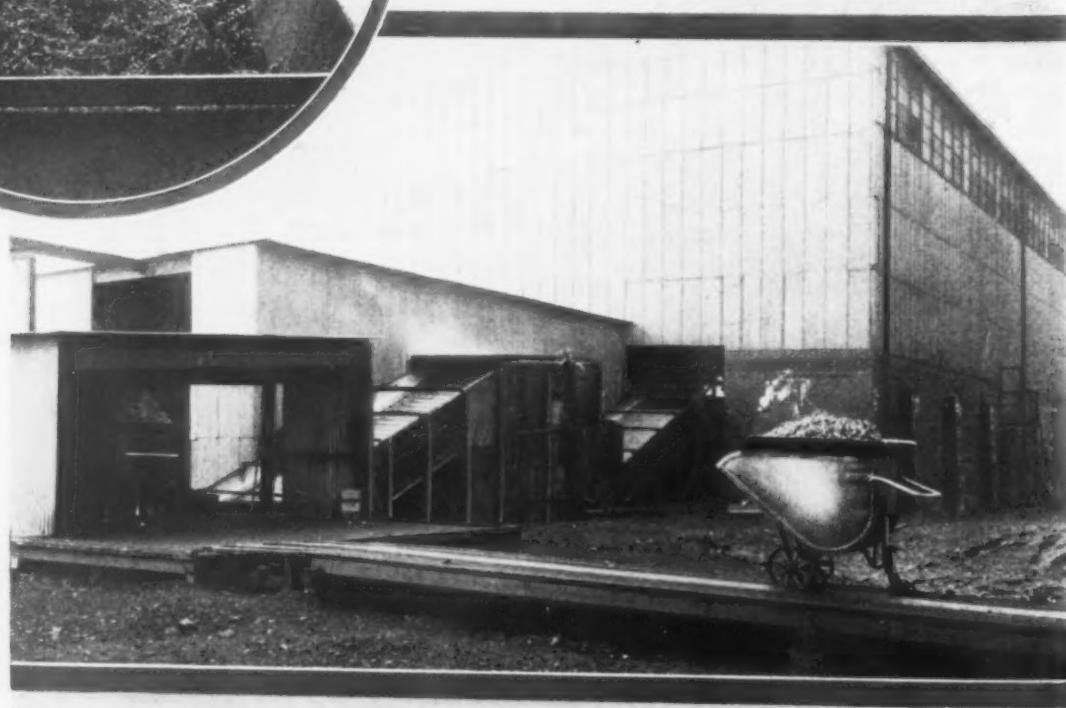
(Continued on page 974)

# Conveyor Washing Process Reclaims Oil From Turnings

**A**N unusual and efficient method of reclaiming oil from steel turnings has recently been put into operation at the new Gambrinus plant of the Timken Roller Bearing Co. at Canton, Ohio. The process has been patented, but nevertheless the process and results obtained will be of interest to plant operators who are confronted with this same problem.



CLOSE up view of a conveyor pan. This is about to enter the washer. The chips are distributed evenly over the pan, which has a wire screen bottom.



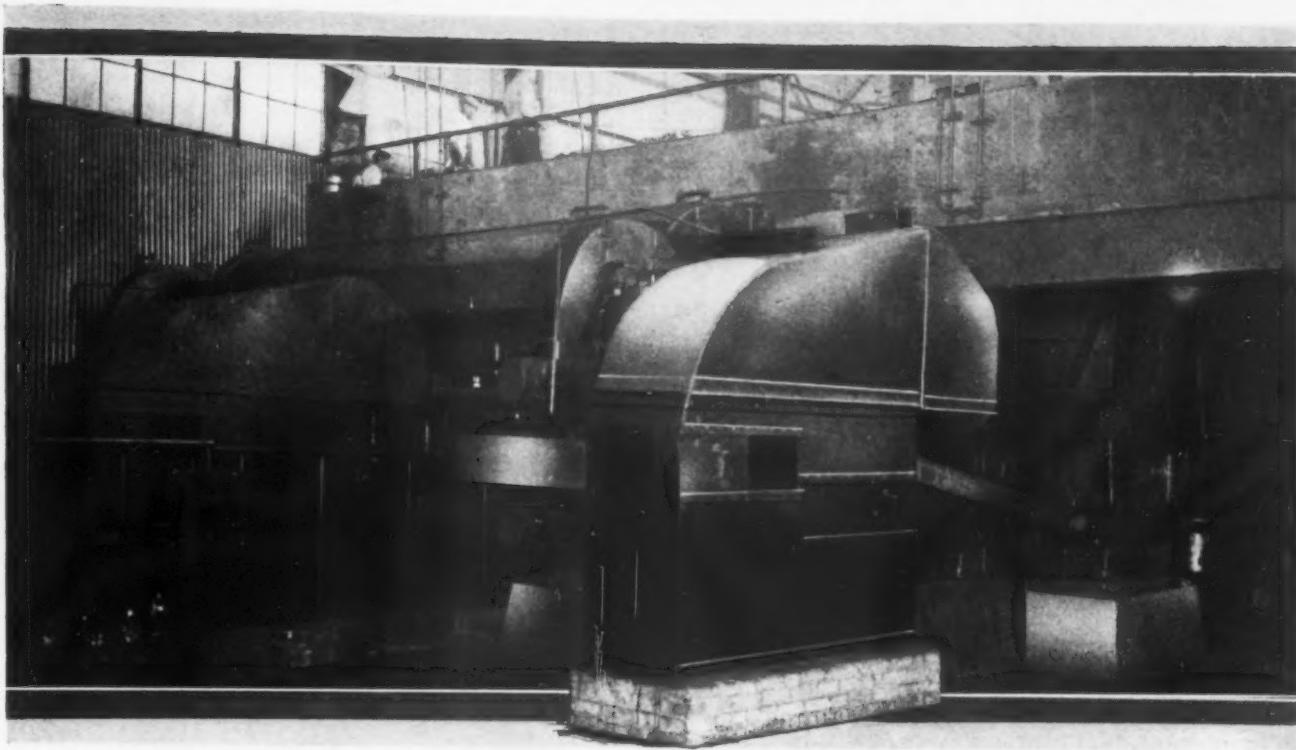
SIX thousand gallons of cutting oil are daily recovered from 120 tons of steel turnings at the new Gambrinus plant of the Timken Roller Bearing Co. Special pan conveyors with screen bottoms carry the turnings through hot water sprays, after which they are briquetted for remelting.

A large quantity of turnings, averaging 120 tons per day, result from the automatic machining operations on the inner and outer races of the Timken bearings.

Three distinct problems are presented: (1) handling this large quantity of turnings; (2) reclaiming the maximum amount of oil; (3) efficiently handling the cleaned chips and preparing them for charging into the furnaces. These three problems have been worked out so that they become integrated in the process required to do this work.

The turnings are collected from the automatic machines by two-wheeled buggies with swivel guiding

THREE-WHEELED buggies bring the turnings to the loading end of the conveyor system. After passing through the washer the cleaned turnings are discharged into the steel foundry building for briquetting and remelting.



wheels and then are taken to the chip washer. The turnings are carried through this on a system of three Rex double-beaded pan-conveyors that were installed by the Chain Belt Co., Milwaukee.

To wash the large quantity of chips efficiently, the conveyor pans were made 6 ft. long with a middle section of galvanized wire screen cloth. The turnings are spread over this area as much as possible. After the turnings are sprayed they are discharged on to the second conveyor which runs in the opposite direction directly underneath the first one, so the turnings are turned over and sprayed again just before they are discharged upon the third conveyor.

This third stage allows the turnings to be turned over two times and sprayed three times so that the maximum amount of oil possible is reclaimed from them. By this process, there are about 50 gal. of oil per ton of turnings reclaimed in the summer time and about 60 gal. per ton reclaimed in the winter. This leaves only 2 to 3 gal. of oil in each ton of turnings after they have been washed.

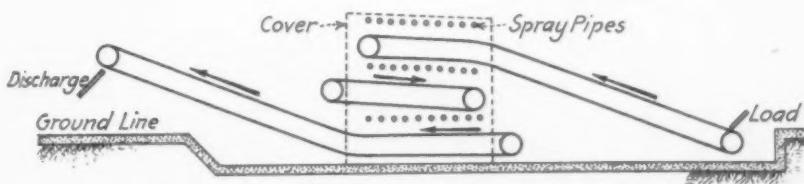
For the washing process, only hot water at 210 deg. Fahr. is used. This is pumped to the washer under 85 lb. pressure, at the rate of 1000 gal. per min. The washing water is stored in a 30,000 - gal.

*AFTER washing, the chips are fed to this pair of 300-ton Southwark briquetting machines. Here they are pressed into blocks which have about 60 per cent of the density of solid steel and which hold together when handling and feeding to the furnaces.*

sump, where it is heated to 210 deg. by live steam. The heat is controlled with a temperature regulator. By heating with live steam, the condensation makes up for the loss of water on the chips, so there is very little make up water added.

The oil, water, and fine turnings coming from the washer conveyors flow into a sump where the fine turnings sink to the bottom and are later taken out with a magnet suspended from a monorail track. The oil and water flow into a settling tank, where the oil rises to the top. It is skimmed off and passed through a centrifugal cleaner before it is used again in the automatic machines.

The sumps and settling tank are all below ground and the chip washer and conveyors are mostly above ground. Each one of the Rex conveyors consists of 6-ft. long double-beaded pans mounted on two strands of steel bushed roller chain with a malleable iron saddle in the center of each link to equalize the stress and wear on both side bars of each strand of chain. The rollers that carry the load are not mounted in the chain but run on case hardened steel bushings on the outside of the chain strand for easy accessibility and maintenance. Unusually close tolerances had to be maintained in forming the over-



*A "REX" chip washing conveyor forms the central unit of the reclaiming system. The turnings are subjected to three washings which extract 96 to 98 per cent of the cutting oil.*

lapping beads of the pans, so that the chips cannot get between them and cause any warping or undue wear.

It can be readily understood that the conveyor must be a substantial one in order to handle successfully the variety of turnings and this is illustrated in the photograph which shows the loading end of the first conveyor.

The turnings, after having passed through the final washing stage, are carried to a storage pit by the third conveyor in the system. A clamshell bucket on an overhead crane takes them from the pit to a machine where they are torn apart and ground up as much as possible, preparatory to pressing them into

briquettes so they can be conveniently handled. They are used as part of the charges for the open-hearth and electric furnaces. The briquettes weigh 25 lb. each and consist of 60 per cent solid material.

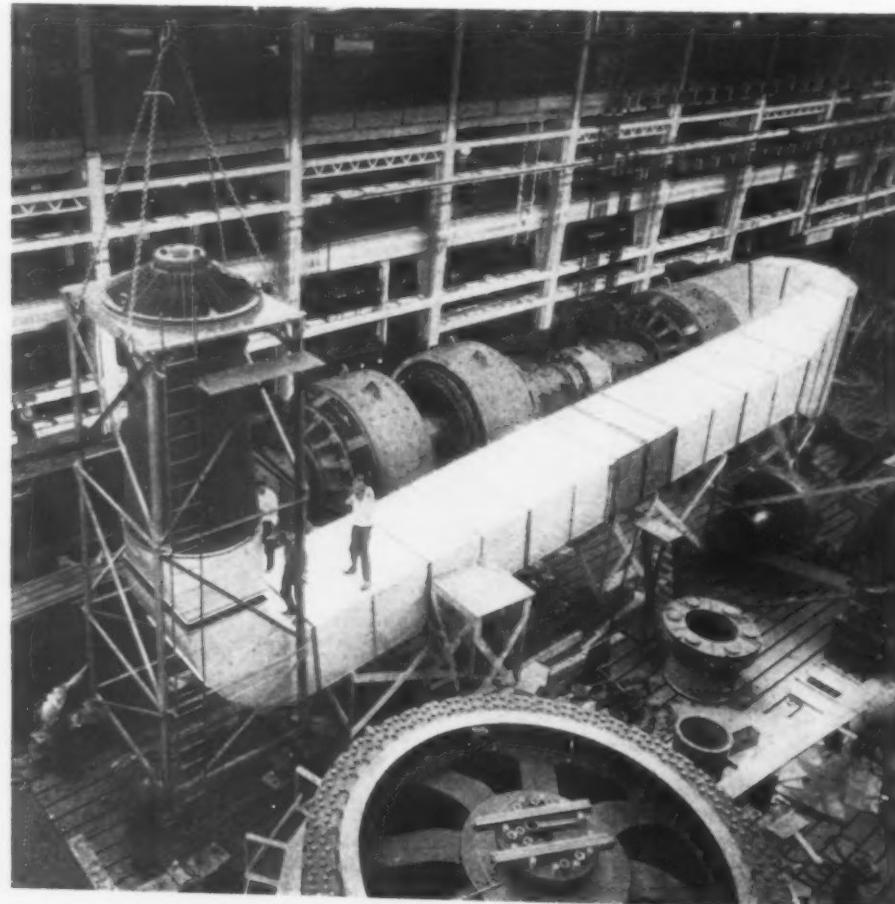
The apparatus used for making the briquettes consists of a battery of two 300-ton Southwark briquetting presses. In these presses, mechanical feed hoppers introduce the chips to a pre-compressing operation for compacting, after which they are fed to the hydraulic punch which forces them into the briquetting molds.

A high percentage of reclamation of oil and turnings has been accomplished by this process at a comparatively small investment.

## 10,000-Hp. Blooming Mill Drive

THESE 5000-hp. double-unit reversing motors for twin drive on a blooming mill will, when installed, deliver 10,000 hp.—more than has ever been applied to a single pair of rolls. They are shown in a shop test at the East Pittsburgh works of the Westinghouse Electric & Mfg. Co., with one of the motors ready to run at full load. To provide proper ventilation to care for the heat generated by these motors under load, a new type of fan of conical shape (shown in foreground) is used to force air through the duct running alongside. The fan is of vertical propeller

type, powered by a 75-hp. motor running at 1450 r.p.m., and forcing 70,000 cu. ft. of air a minute into the motor to keep it cool. Previously this type of fan has been used only on ships, where its function has been to keep the air pressure for forced draft in the entire boiler room. The final installation of the motors will follow the machine procedure, but no ducts or piping will be necessary. In the mill, one of these motors will be set behind and above the other, the whole installation measuring only 75 ft. long.



924—*The Iron Age*, October 2, 1930

# Machine Shop Accounting with the Aid of Mechanical Methods

By THOMAS B. FRANK

Treasurer, Cincinnati Planer Co., Cincinnati

**I**N these days of speed, efficiency and highly competitive bargaining we have come to accept machines as a material aid to practically all of our efforts. The field of accounting has been invaded by the machine and now we find most offices adding and calculating, billing and copying and even sorting and tabulating by mechanical methods. Most business men are familiar with the common types of mechanical office equipment. Hence this article will deal only with the mechanical sorting and tabulating features as they have been applied to accounting in the machine shop.

Modern business conditions make it imperative that accurate and up-to-date accounts be kept of all business transactions. The complexities of present-day industrial development compel the business executive to fortify his every action with facts and figures, lest he become involved in matters that may prove costly, or even ruinous, to his business.

Accounting has kept pace during the rapid development of the past 15 years in all of the arts and sciences. Industry has called more and more upon the accountant for information upon which to base executive decisions. Accountancy has met that challenge by developing many new ideas and new methods, both analytical and instructive as well as constructive, which give management more information than ever before.

However, in all this progress, there has been a tendency on the part of management to limit the expense of accounting departments, and at the same time to expect better results. This pressure for simplification and economy has been a boon to the accountancy profession, as it has been the means, or rather the incentive, by which labor-saving and cost-reducing methods and machines have been developed. These newer

MACHINERY has multiplied the power of the human hand many fold. Each wage earner in industry can turn out a product greatly in excess of any output which was possible to his grandfather. Accounting is a recent example where the extension of machinery has greatly multiplied the productivity of man's fingers. The author tells how his company makes use of mechanical tabulating equipment for sorting and analyzing pertinent facts regarding the business. One great utility of this equipment lies in its ability to aggregate, by groups, information in any desired order. Its flexibility appears to be almost unlimited.

methods and machines have taken the guesswork and human inefficiencies and inaccuracies out of the accounting departments of modern business establishments.

## Four Kinds of Accounting

ACCOUNTING work falls into one of four classes; historical, analytical, critical and constructive. Historical accounting is mere bookkeeping, the recording of facts and figures of transactions that have already transpired.

Analytical accounting takes the recorded facts and figures of the past, combines them with the facts and figures of the present, analyzes them and points out the whys and wherefores. It interprets the figures.

Critical accounting is a combination of the analytical and interpretive functions, in that the results of the analytical and interpretive work are broken down into the component parts, and the causes therefor criticized and discussed and action taken for the correction or change of wrong methods, and of the causes therefor, and for the improvement of the methods of performance.

Constructive accounting combines all of the foregoing phases into a program for the building up or rehabilitating of accounting systems, to make for greater accuracy, greater efficiency or greater usefulness.

The use of machines in accounting work probably falls primarily in the constructive class, although the machines are used to advantage in compiling data for all classes. By their means greater efficiency, accuracy and usefulness of all accounting work is obtained. All of this is secured at less cost than by any other method. The results of the historical, analytical, critical and constructive accounting activities can be tabulated and classified and then made ready

for use by management in remarkably short time.

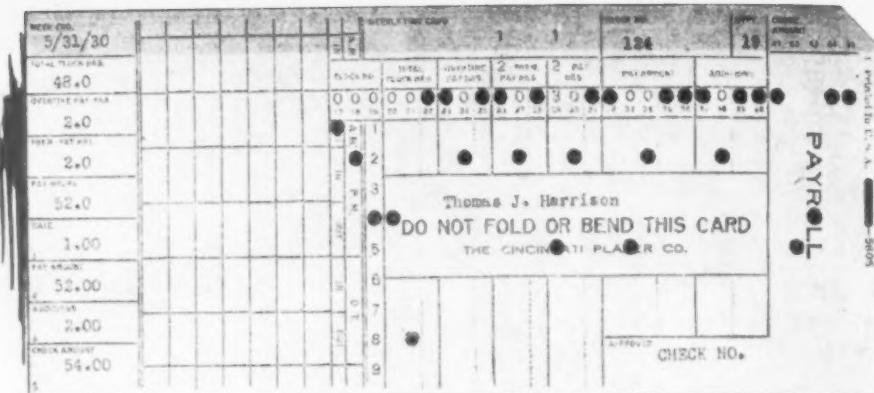
## *What Tabulating Equipment Is and What It Does*

**A**BRIEF description of tabulating equipment will be given, to permit a definite understanding of the methods herein-after referred to. It consists principally of three machines, a key-punch, a sorting machine and a tabulating machine.

The key-punch is provided with a keyboard of the figures from 1 to 9 and the zero, as well as a number of control or operating keys. By means of this punch, perforations are made in card forms to indicate, by their position on the card, the figures represented thereon by written information. An experienced operator can punch about 2200 cards a day.

By a series of electrical contacts made through the perforated or punched holes, the sorting machine selects the different figures punched on the cards as they pass through a slot on the machine, and drops them into a separate pocket for each figure. This machine sorts at the rate of 400 cards a minute.

The tabulating machine adds or counts at the rate of 90 to 100 cards a minute, and adds in one operation all columns punched on the cards, showing the totals on different dials. The cards are fed through the machine automatically. All the operator does is to



*Fig. 1—Clock Card, Replacing Old Payroll Book*

put the cards into the container on the machine.

The time-saving features of this mechanical equipment are obvious, as is also the scope of the work that may be done with the machines.

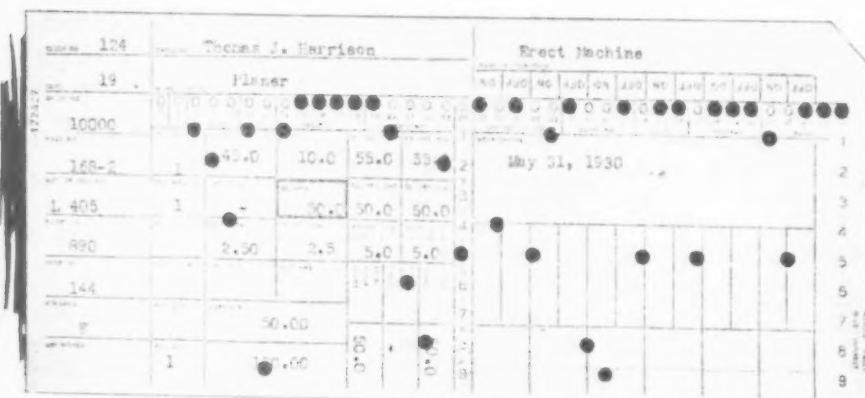
By means of this mechanical tabulation many of the original shop records, such as time cards, clock in-and-out cards, requisitions, etc., may be made to do double and triple duty. Many copying operations may be eliminated, as the original card record becomes the final, and therefore the only, record of detail.

### Cards Replace Payroll Book

The old payroll book may be discontinued, and the original clock in-and-out card made the authority for payment of employees. At the end of the pay period the clock cards are sent to the office, where they are figured and all information is then punched into the card as shown on Fig. 1. The cards are then sorted according to employee number, and the totals of all columns obtained by a run through the tabulator. The totals so obtained constitute the total payroll figures.

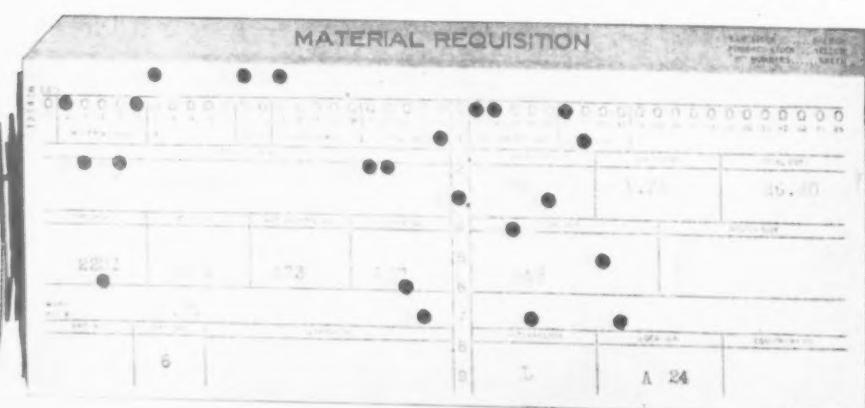
After recording on the card the method of payment (check number, etc.), the cards may be filed according to employee number for future reference. The cards are then in order for tabulation of yearly earnings per employee, etc., as required for income tax purposes and other reports. Mechanical tabulation makes this task an easy one to perform and it consumes very little time. The savings compared with old hand methods are obvious.

In addition to the clock cards, most shops use job-cards to record the time consumed on each particular job going through the shop. The different classes of work in the shop, such as Direct Labor, Indirect Labor or Spe-



*Fig. 2—Job Time Card, Carrying Also the Burden, Making Computation of Completed Cost Easy (Above).*

*Fig. 3.—Material-Requisition Card Helps in Control of Inventory.*



*Fig. 5—Maintenance-Order Card, Used in Same Manner as Those for Production.*

cial, may be designated by cards of different colors. The colors are a distinct aid to the clerks who figure the cards, as they do not have to stop to read the information on the card to know what method to use in calculating the time, earnings and burden applied to each card.

A sample of a job-card is shown on Fig. 2. One of these cards is made out for each job worked on by each worker during the pay period, usually one week. The total time and earnings on these cards should balance with the time and earnings shown on the clock in-and-out cards which were used for the payroll. Other pertinent information is also shown and punched into the card, such as clock number, department, group number (group or unit of product, where the individual part being worked on is to be used), piece number, account or order number (to which the time is to be charged), equipment number (number of shop machine on which the work is done), hours, earnings and burden.

Note that the burden is computed on the job time card. This is done to facilitate final tabulation without a second handling of the cards. The burden is based on the machine-hour for machining operations and on the man-hour for assembly or vise work. Therefore it is a simple matter to compute the burden upon the hours shown on the job-cards. These cards, when filed by order or account numbers, are then ready for the tabulation of the completed cost.

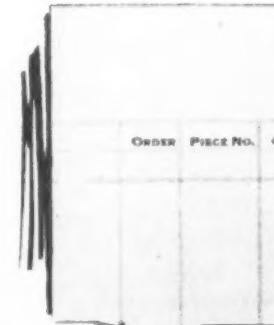


Fig. 4—Cost Summary Card Used

Requisitions for materials used are made out on cards, also, Fig. 3, and are filled out direct from information contained on bills-of-material or material lists. The

essential information is punched into the card as shown. All of the cards representing materials issued to the production departments from stockrooms, during a given period, are then sorted by classes of materials and are tabulated. The resulting figures constitute the transfer from inventory accounts to the work-in-process account. The cards are then filed by order number, and are ready for the compilation of the completed cost.

Cost summary sheets are provided to record the tabulation of both labor and materials and the 4. The cards for a given order, and material requisitions, are re- and re-sorted, if necessary, so as ement called for on the cost sum- are put into the tabulator and the ne total figures from the machine ne machine stops automatically at rring each to the summary sheet.

both labor and materials and the burden as well—Fig. 4. The cards for a given order, both labor cards and material requisitions, are removed from the files and re-sorted, if necessary, so as to obtain the arrangement called for on the cost summary. The cards are put into the tabulator and the operator takes off the total figures from the machine as they come up (the machine stops automatically at each total), transferring each to the summary sheet.

A grand total of all cards should equal the total cost of the order. This may be checked and double checked in any manner desired, on the machine, by simply running totals of the various classifications needed. By this mechanical method the work may be done in from one-third to one-fifth of the time required by older hand methods, and it is done with the utmost accuracy.

In most machine shops there are several classes of work being performed, which usually are designated as Lot Orders, Stock, Jobs, Repairs, Tool Orders, Maintenance Orders, etc., all of which may require separate and individual forms for cost compilations. However, the principle is the same: they may all be

(Continued on page 975)

*Fig. 4—Cost Summary, Compiled from the Cards in Figs. 2 and 3,  
Used as Basis for Charging or Billing*

# Should Steel Machinery Parts Be Cold Rolled?

By G. S. von HEYDEKAMPF, Dr. Ing.\*

Research Engineer, Southwark Foundry & Machine Co., Philadelphia

OBJECTIONS may be raised to the conclusions suggested by the author in his article in THE IRON AGE of Sept. 18 that an increase in fatigue strength would be of doubtful value if gained by sacrificing an essential part of the ductility of the material, that cold working of any kind is known to reduce the elongation at fracture of tensile test pieces, and that such elongation is generally considered to be a measure of ductility.

In these tests, however, the cold-worked area in a cross-section is so small that no appreciable loss of elongation is to be expected, and the ductility, as indicated by the elongation at fracture of a tensile specimen, will not be greatly affected, especially as the specimens were of hard steel.

But the ductility, measured by the elongation at fracture under a static load, and which may be called "static" ductility, does not merit any too great consideration, at least so far as fatigue failure is concerned. While there is not space in this article to take up this point in full detail, the following brief explanation may serve to justify the above rather unusual statement.

Static ductility measures the ability of the material to withstand without fracture great plastic deformation at stresses near to the ultimate tensile strength. In fatigue tests and in practical service the stresses remain very much lower than this ultimate strength value. The static ductility, then, does not necessarily indicate the ability to deform plastically

\*The author was identified with the Babcock & Wilcox Co. when his article, of which the present one is a supplement, appeared in the issue of Sept. 18. Meanwhile he made his new connection, as indicated above.

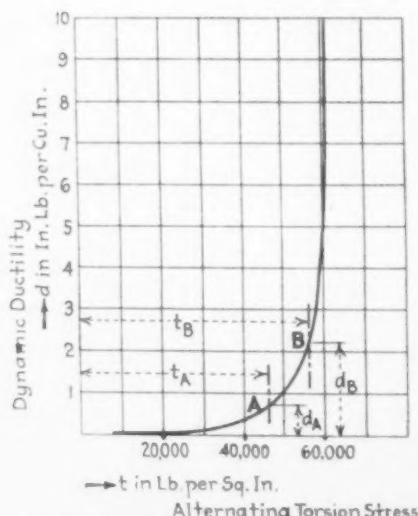
†A very brief discussion of ductility accompanying very slight plastic action is given in Bulletin 164, Engineering Experiment Station, University of Illinois.

without fracture under repeated cycles of stress in the service, or the fatigue-test range. It seems to be logical to use such plastic deformation as occurs within the range of fatigue tests or of service stresses as a measure of such ability.

The name "dynamic ductility" is suggested for this property. As shown by many tests nearly all materials actually exhibit slight plastic deformation even when stressed within the range of fatigue strength (say to 40 or 50 per cent of the ultimate tensile strength for metals). Furthermore, this dynamic ductility for a given metal is not always proportional to the static ductility.†

According to O. Foepl, who apparently was the first to emphasize the importance of this dynamic ductility, the best method of measuring its value consists in measuring the mechanical work absorbed per unit volume of the material when subjected to a complete stress cycle of completely reversed stress.

This work, absorbed due to plastic deformation, damps free vibrations of the material, even in the absence of any external damping force. For this reason the dynamic ductility has also been called "damping capacity." Moreover, the dynamic ductility as determined by Foepl is equal to the "mechanical hysteresis" for any cycle of stress. This absorbed energy is transformed into heat and causes a rise of temperature in a running fatigue specimen. Such a rise of temperature does not necessarily indicate the start of a fatigue crack, but can frequently be detected for stresses below the fatigue limit. The whole subject of measurement of dynamic ductility will be discussed more fully in a later article in THE IRON AGE, especially



A STEEL of 212,000 lb. tensile strength showed the dynamic ductility factor of B when the specimen was cold rolled and the factor A when not cold rolled

in connection with the problem of the elastic limit.

Results of a test for dynamic ductility may best be shown by a graph plotted, with values of maximum stress during a cycle as abscissas and values of plastic work absorbed per cycle per unit volume as ordinates. Such a graph for steel "X" of the Deutsche Edelstahlwerke is here reproduced. This steel has the same composition as steel "Y", referred to in the earlier article, but has another heat treatment, so that the tensile strength was 212,000 lb. per sq. in. The cycle of stress used was a cycle of completely reversed torsional stress.

It may be seen that the dynamic ductility of this steel is small for low stresses, but begins to increase rapidly for stresses in the vicinity of 50,000 lb. per sq. in. From fatigue tests it was determined that the endurance limit for specimens polished but not cold rolled,  $t_A$ , was 47,000 lb. per sq. in., while the endurance limit for specimens polished and then cold rolled,  $t_B$ , was 55,000 lb. per sq. in. The dynamic ductility,  $d_B$  for the cold-rolled specimens is seen to be much greater than  $d_A$ , the dynamic ductility for the non-cold rolled specimens. The non-compressed specimens break, due to surface imperfection, before the increase of dynamic ductility from  $d_A$  to  $d_B$  can be utilized.

So by cold rolling the surface, not only is the fatigue strength increased, but the endurance limit is shifted into a field of higher dynamic ductility. This effect may well be at least as important as the direct increase of endurance limit. For further discussion of this point the author can supply a list of articles that have appeared in Germany on the subject.

Results herein reported show that, for two kinds of steel tested, the endurance limit was increased approximately 15 per cent by means of cold rolling the surface of the specimens, and at the same time the dynamic ductility (available work absorbed by plastic action) was increased for the range of stress corresponding to the endurance limit. Other tests have shown similar results for Lautal (light metal), copper and bronze.

#### Conclusions

This method seems to be of peculiar promise in connection with highly stressed machine parts, which sometimes break after a relatively short period of service. Even if the stress is above the endurance limit, the tests indicate that the length of service before fracture may be very considerably lengthened by cold rolling the surface. This is illustrated by specimen No. 73 in the table, on page 777 (THE IRON AGE, Sept. 18).

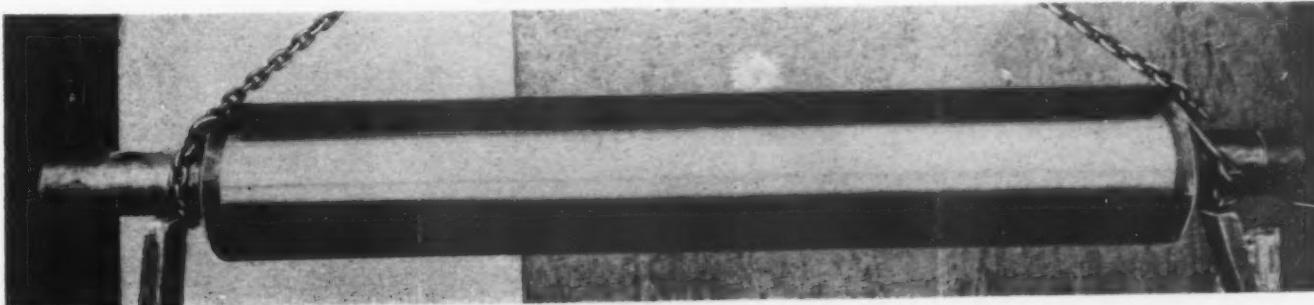
This, even with a 10 per cent higher stress, lasted from 35 to 150 times as long as did the corresponding specimens which had not been cold rolled. A similar and probably still greater increase of service time is to be expected when stressing the cold-worked parts not higher than the polished ones. This increase in lifetime would be utilized by replacing normally finished parts, which now fail after short service, by cold rolled pieces.

Practical problems in the utilization of this means of increasing fatigue strength and effective ductility, such as the question whether to replace polishing by cold rolling, or merely add the new cold-rolling operation to the usual grinding finish, are under investigation at the present time.

### Cast Iron Roll for Rolling Glass

THE roller here shown is 6 ft. long and 1 ft. in diameter, made of cast iron for rolling glass. It is a product of the Busch-Sulzer Brothers-Diesel Engine Co., St. Louis. To meet the shock-contact of molten

glass and impart smoothness of surface to the glass, ruggedness, density and lack of porosity were required as well as heat treatment to prevent deformation and to remove casting strains.

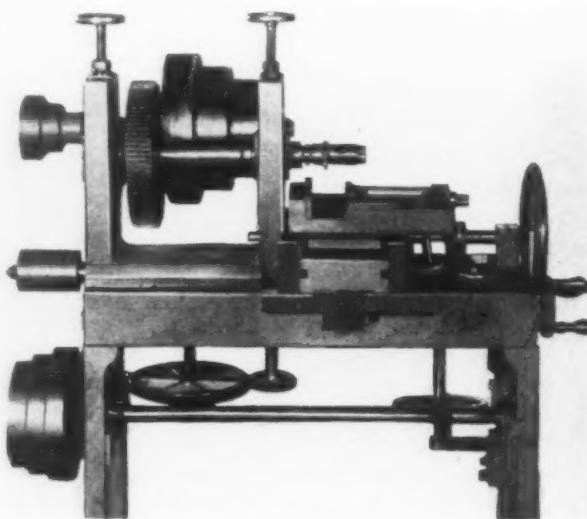


## SOME OF THE PREDECESSORS OF OUR AMERICAN MACHINE TOOLS AND ENGINES

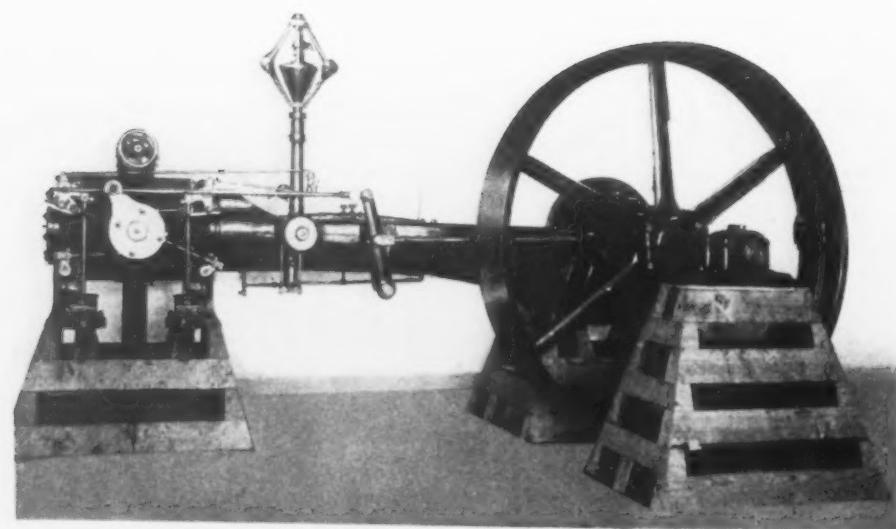
AMONG the permanent or semi-permanent exhibits in the Museums of the Peaceful Arts, at 220 East Forty-Second Street, New York, are those illustrated. These are merely samples of a large number of old pieces of equipment of various descriptions which the museum has on display. The early history of the machine tool industry is tied up in many of these old units. They mark in some instances the real beginnings of our modern tooling and precision machining.



*Hand-operated gear-cutting machine for direct, simple indexing, showing a vertical work arbor and plates for direct indexing and for simple indexing.*

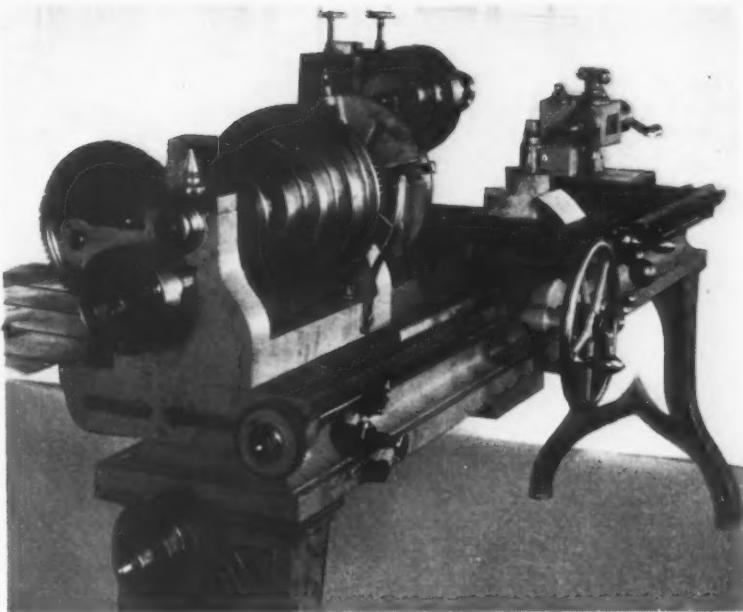


*Plain milling machine built by Robbins & Lawrence Co. at Windsor, Vt., about 1851.*

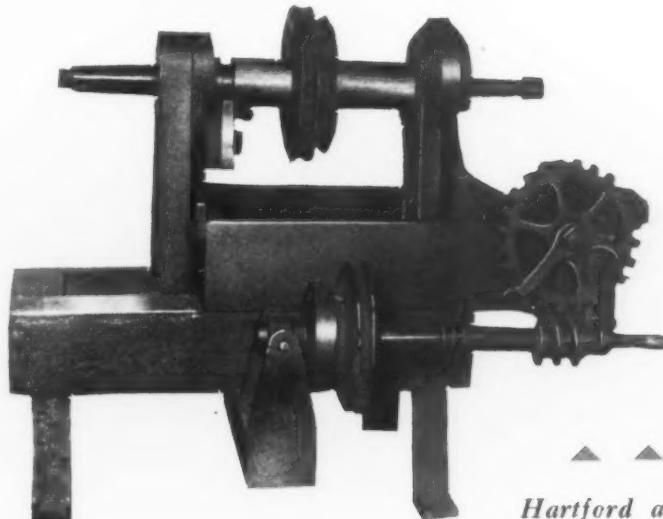


*Corliss engine built about 1884.*

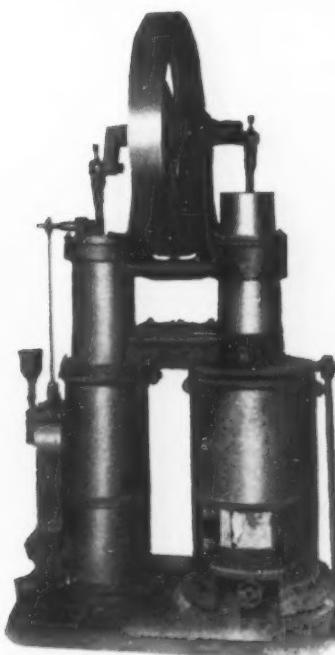
*Engine lathe built by Robbins & Lawrence Co. at Windsor, Vt., 1852. This was designed by Frederick W. Howe and Richard S. Lawrence.*



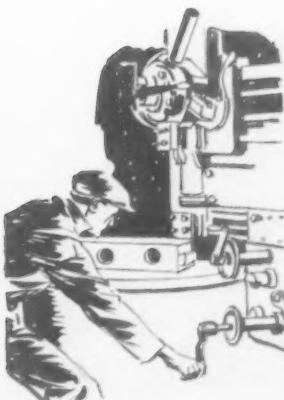
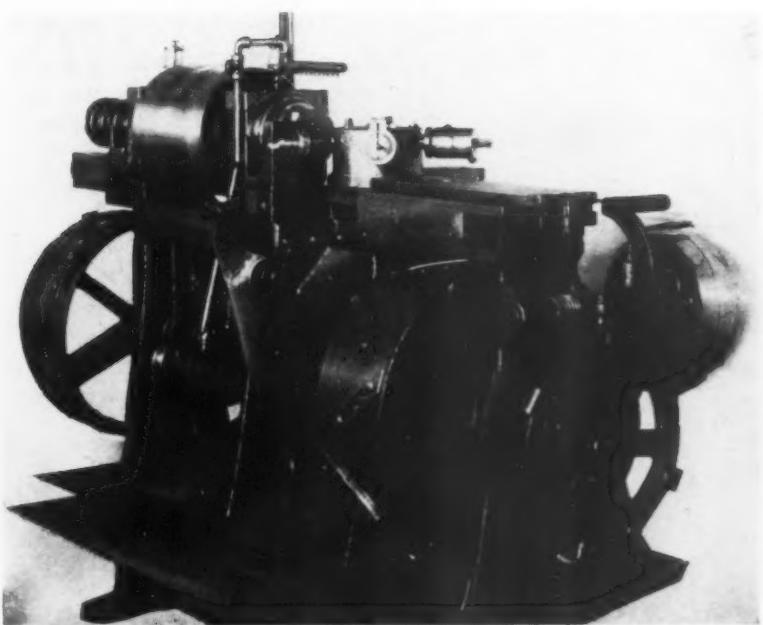
*Original milling machine built in 1818 by Eli Whitney, famed as the inventor of the cotton gin.*



*Hartford automatic screw machine, being an early Spencer automatic lathe or screw machine.*



*Ericsson hot air engine for pumping.*



# Offers Some New Hardness Tables

By T. N. HOLDEN, Jr.

*Metallurgist,  
E. W. Bliss Co., Brooklyn*

DUUE to the interest shown in the conversion tables for hardness tests, published in THE IRON AGE of July 10, it has seemed advisable to offer two more which are reproduced herewith. One of the tables deals with the Brinell hardness using a 5-mm. ball with 750 and 250-kg. load. The other table shows Brinell hardness numbers using a 10-mm. ball with 3000, 1000 and 500-kg. load.

The chart showing Brinell numbers, arrived at from the use of the 5-mm. ball, is considered useful in determining the hardness of sheet metal which would be too thin to test with a 10-mm. ball. The other chart, in which a 10-mm. ball is used, is not new except that it shows the Brinell number with a 1000-kg. load. This 1000-kg. load is applicable for testing bronzes and

aluminum alloys for which the 3000-kg. load is too much and the 500-kg. load too little.

Reasons for publishing these tables are that they are not commonly printed and it is my opinion that they would be used if they were made accessible for testing metals.

A recommended standard practice for the preparation of surfaces for Brinelling is as follows:

For a 10-mm. ball and a hardness number less than 248, fine grinding or filing is satisfactory. For hardness numbers higher than 248, fine grinding with an emery cloth polish is recommended. For the 5-mm. ball use emery cloth finish.

So far as other details are concerned, the charts are self-explanatory.

BRINELL HARDNESS NUMBERS  
Diameter of Ball = 5 mm.

Diam. mm.	Load KGMS.		Load KGMS.		Load KGMS.			
	750	250	mm.	750	250	mm.	750	250
1.00	945	315	1.70	321	107	2.40	156	51.9
1.025	899	300	1.725	311	104	2.425	153	50.7
1.05	856	285	1.75	302	101	2.45	149	49.6
1.075	817	273	1.775	294	98	2.475	146	48.5
1.10	780	260	1.80	285	95.0	2.50	143	47.5
1.125	745	249	1.825	277	92.4	2.525	140	46.5
1.15	712	237	1.85	269	89.7	2.55	137	45.5
1.175	682	227	1.875	262	87.3	2.575	134	44.6
1.20	653	218	1.90	255	84.9	2.60	131	43.7
1.225	626	209	1.925	248	82.7	2.625	129	42.7
1.25	601	200	1.95	241	80.4	2.65	126	41.9
1.275	578	193	1.975	235	78.4	2.675	124	41.0
1.30	555	185	2.0	229	76.3	2.70	121	40.2
1.325	534	178	2.25	223	74.3	2.725	119	39.4
1.35	514	171	2.05	217	72.4	2.75	116	38.6
1.375	496	165	2.075	212	70.6	2.775	114	37.8
1.40	477	159	2.10	207	68.8	2.80	111	37.1
1.425	461	154	2.125	201	67.2	2.825	109	36.4
1.45	444	148	2.15	197	65.5	2.85	107	35.7
1.475	429	143	2.175	192	63.9	2.875	105	35.0
1.50	415	138	2.20	187	62.4	2.90	103	34.3
1.525	401	134	2.225	183	60.9	2.925	101	33.7
1.55	388	129	2.25	179	59.5	2.95	99.2	33.1
1.575	375	125	2.275	174	58.1	2.975	97.3	32.4
1.60	363	121	2.30	170	56.8	3.0	95.5	31.8
1.625	352	118	2.325	167	55.5			
1.65	341	114	2.35	163	54.3			
1.675	331	111	2.375	159	53.0			

BRINELL HARDNESS NUMBERS  
Diameter of Ball = 10 mm.

Diam. mm.	Load KGMS.			Load KGMS.			Load KGMS.				
	3000	1000	500	mm.	3000	1000	500	mm.	3000	1000	500
2.0	945	315	158	3.35	331	110	55.1	4.70	163	54.3	27.1
2.05	899	300	150	3.40	321	107	53.4	4.75	159	53.0	26.5
2.10	856	285	143	3.45	311	104	51.8	4.80	156	51.9	25.9
2.15	817	272	136	3.50	302	101	50.3	4.85	152	50.7	25.4
2.20	780	260	130	3.55	293	97.7	48.9	4.90	149	49.6	24.8
2.25	745	248	124	3.60	285	95.0	47.5	4.95	146	48.6	24.3
2.30	712	237	119	3.65	277	92.3	46.1	5.00	143	47.5	23.8
2.35	682	227	114	3.70	269	89.7	44.9	5.05	140	46.5	23.3
2.40	653	218	109	3.75	262	87.2	43.6	5.10	137	45.5	22.8
2.45	627	209	104	3.80	255	84.9	42.4	5.15	134	44.6	22.3
2.50	601	200	100	3.85	248	82.6	41.3	5.20	131	43.7	21.8
2.55	578	193	96.3	3.90	241	80.4	40.2	5.25	128	42.8	21.4
2.60	555	185	92.6	3.95	235	78.3	39.1	5.30	126	41.9	20.9
2.65	534	178	89.0	3.70	514	71	35.7	4.0	229	76.3	38.1
2.70	514	171	85.7	4.05	223	74.3	37.1	5.40	121	40.2	20.1
2.75	495	165	82.6	4.10	217	72.4	36.2	5.45	118	39.4	19.7
2.80	477	159	79.6	4.15	212	70.6	35.3	5.50	116	38.6	19.3
2.85	461	154	76.8	4.20	207	68.8	34.4	5.55	114	37.9	18.9
2.90	444	148	74.1	4.25	201	67.1	33.6	5.60	111	37.1	18.6
2.95	429	143	71.5	4.30	197	65.5	32.8	5.65	109	36.4	18.2
3.00	415	138	69.1	4.35	192	63.9	32.0	5.70	107	35.7	17.8
3.05	401	134	66.8	4.40	187	62.4	31.2	5.80	103	34.3	17.2
3.10	388	129	64.6	4.45	183	60.9	30.5	5.90	99.2	33.1	16.5
3.15	375	125	62.5	4.50	179	59.5	29.8	5.95	97.3	32.4	16.2
3.20	363	121	60.5	4.55	174	58.1	29.1	6.00	95.5	31.8	15.9
3.25	352	117	58.6	4.60	170	56.8	28.4				
3.30	341	114	56.8	4.65	167	55.5	27.8				

# National Metal Exposition in Chicago

## Stressed Alloys and Welding

**I**N a setting unique the National Metal Exposition last week in Chicago differed from any other ever held by the American Society for Steel Treating. The spacious Hotel Stevens never housed so large a display. It gave up space usually used for routine purposes.

The 200 or more exhibitors occupied about 35,000 sq. ft. but were located in several parts of the building. Besides the main exhibit hall in the basement, which was inadequate, the large main ballroom was filled and the foyer outside. From there it spread continuously to the lounge which leads to the main dining room, which was also fully occupied. There were other nooks and corners, particularly in the basement, where exhibits were located.

While there were some disadvantages because of the dispersed character of the display as a whole—not in one large place as in the Cleveland auditorium last year—there were many advantages. Expressions of disapproval because of the new conditions were generally outweighed by statements that contacts were more easily made under the one roof where members and visitors lived, and that one could go from a technical paper's presentation to the exhibits and back again at any time.

While the exposition was less than half as large in space as last year and in other more recent years, in beauty of surroundings and in conveniences it has been unsurpassed. Particularly striking was the ballroom, where most of the steel companies were located.

### Distinctly an Alloy Exposition

"An Alloy Exposition" was an expression frequently heard as the impression of many visitors. Undoubtedly this was justified. At almost every turn, alloy steels or special alloys, ferrous and non-ferrous, commanded one's attention. If there is any doubt that the "alloy age" is upon us, this year's exposition dispelled it. To call attention, here in detail, to all of the alloys, old and new, is not possible. The advance in these fields was convincingly demonstrated.

### Impressive Showing by Steel Companies

Progress made recently in the development of corrosion-resisting steel and products fabricated therefrom featured the exhibits of steel companies at the exposition. At least a

dozen companies displayed chrome-nickel alloy steels in various forms ranging from minute samples of wire to a completed automobile with visible parts made principally of such materials. Exterior parts of this car were made of 16 to 18 per cent chromium steel with no nickel content and included the hood, radiator, fenders, side apron, head and cowl lamps, windshield frame, instrument panel, door handles, gasoline tank cover, wheel hubs and spokes and other smaller fixtures.

The wide range of uses to which corrosion-resisting steels are now being put attracted as much attention among casual visitors to the exposition as among those identified with the steel and allied industries. A completed soda fountain entirely equipped with high chrome-nickel steel fixtures was prominently displayed by one company, while another showed a section of steel tubing so small that a microscope was necessary to observe its construction. With nothing essentially new in metallurgical content manufacturers centered their attention upon the wide diversity of uses for non-corrosive materials, em-

phasizing the great potentialities which this market offers.

High-speed and tool steels in various applications were also shown by a number of makers. Progress during the year seems to have been along the lines of further refinement in use rather than in new materials. Cutlery steel in the full range of application was shown by United States as well as foreign makers while die steels were prominently exhibited.

In the castings field, heat-resisting alloys occupied a prominent place. Here also chrome-nickel products were numerous, with certain parts for furnaces and heat-treating equipment capable of resisting temperatures up to 2000 deg. Fahr. Other alloy parts shown were designed for carburizing boxes, lead, salt and cyanide pots, dipping baskets, trays, rollers, etc. Acid-resisting alloys were also exhibited by several makers.

### Welding Exhibits Comprehensive

The welding section included the products of more than 25 companies. Welding, cutting and brazing equipment and accessories of all types were demonstrated, much of it in ac-



**AROUSA AROUTUNOVA**, a Russian metallurgist, was a visitor at the exposition. A photographer posed her at a hardness testing machine. She has been in this country about a year at the Ford company laboratory in Detroit and will return to Russia in charge of heat treatment at the new Ford plant, **Autostroy**, in Nijni Novgorod, Russia.

tual operation. In addition, there were comprehensive displays of welded products, small and large; also photographic exhibits and engineering data covering all types of welding applications.

Welding rods and wire, shown by several companies, included tobin bronze, aluminum and other non-ferrous metals and rods for welding austenitic chromium-nickel alloys. Among the latter was a new flux-coated rod, said to be suitable for overhead and vertical welding and for welding the 18 and 8 alloys to mild steel. Hard facing alloys in welding rod form were exhibited, and the specimens of faced ploughshares and other parts reflected increased use of these materials.

Welding and cutting torches and regulators of many designs were to be seen. One company featured a new precision duplex, simultaneous welding and cutting, pressure regulator. Oxy-acetylene motor-driven shape cutting machines were demonstrated, and a portable tensile machine for testing welds in the field was shown.

Arc welding equipment included both carbon and metallic arc, portable and stationary, motor, gas-engine and belted drive, single and two-operator units. A new portable two-bearing welder equipped with remote current control, a convenience on structural and similar work, was featured by one company. A control device on the welding cable, a few feet from the electrode holder, actuates an indicator on the welder; the indicator is large and may be seen easily by the operator from his working position.

An Electronic Tornado machine for carbon arc welding was demonstrated in the welding of 36-in. diameter,  $\frac{1}{2}$ -in. wall pipe. The weld obtainable is ductile, with an elongation of 20 to 25 per cent in 2 in. and tensile strength ranging from 60,000 to 80,000 lb. per sq. in. Automatic seam welders were also in operation at the booths of two other companies.

Atomic-hydrogen arc welders, both hand and automatic, the latter a recent development, were shown. The automatic unit, longitudinal for seam welding, consists of a work-clamping device, an automatic travel carriage, a welding head and control devices. An auxiliary device feeds the filler rod into the arc. Equipment to dissociate anhydrous ammonia into its component parts, supplying hydrogen economically for atomic-hydrogen welding, was also introduced by this company.

One of the newest developments in the arc welding field, demonstrated by the same company, is a portable self-propelled automatic unit for welding steel floors of buildings, ship decks and for use on the tops and bottoms of oil storage tanks and for similar work. The electrode is fed automatically and the machine has a wide range of speed.

Electric equipment for brazing or hard soldering brass, copper, bronze or steel, another item of this company's exhibit, features regulated heat application to the jaws of the clamp-

ing tongs. Heat is generated by passing current through a pair of carbon blocks between which the parts to be joined are clamped. An electric brazing torch of light weight was introduced by another manufacturer. This device operates on the principle of the carbon arc and takes current from a light socket; it is made up of a handle, carbons, lead cable and reactor coil. A tightening grip on the torch handle brings the carbons together and closes the circuit. The carbons are then permitted to separate slightly, and the arc is formed.

#### Improved Resistance Welders Shown

New and markedly improved electric resistance welding machines were introduced at this exposition. One company demonstrated a combination hand and foot-operated spot welder equipped with a four-speed motor. The switch and pressure are cam controlled. Electrodes and transformer are water cooled, and a spring pressure gage is provided to facilitate resetting. The machine has a 12-in. hardened and ground steel slide with take-up gibbs. The same company exhibited a butt welder having combination motor and hand upset. The push-up is cam operated and the dies can be opened to permit annealing. A safety feature is the ratchet release, which prevents damage to the upsetting mechanism.

A seam welder and a press welder incorporating a number of significant improvements were demonstrated by another company. These machines were described at length in *THE IRON AGE* of Sept. 18 and Sept. 25. A new butt welder, which among other features has an aluminum platen, new air clamps and fully automatic power-driven push-up, was a center of attraction at the same booth.

Hand and head type welding shields were among the large variety of accessories displayed; an automatic eye protector for use in connection with such shields was introduced. In this, the welding current passes through an induction coil, setting up a second current that actuates magnets and causes the lenses of the eye protector to flip into the welder's line of vision. The instant the welding arc is broken the magnets release their hold and the lenses flip out of the line of vision. A plugging arrangement permits disconnecting the helmet from the line coil instantly. The welder has free use of both hands and is saved from the necessity of repeatedly removing and replacing his helmet or of tipping it back on his head to inspect the work.

#### Samples of Welded Products

Specimens and photographs of welded products reflected increased application of the welding processes. One company showed pressure vessels made of class B  $\frac{3}{4}$ -in. thick welding steel plate with flanged and dished heads having a 20-in. spherical radius, with 3-in. fillet radius. The plates tested to 58,400 lb. tensile, 36,400 lb.

yield point and showed 30 per cent elongation. The vessel was 20 in. outside diameter and 18 in. long in the straight shell.

During the test the original spherically dished heads changed to ellipsoid form with an axis ratio of 1 to 2. The shell stretched 6 in. at mid-section. Although the theoretical bursting pressure of the shell was 4733 lb. per sq. in., the actual pressure applied exceeded this figure without sign of failure either in the weld or the plate. The welding was by the "metallurgically controlled, tempered arc" process used by the company in fabricating all types of welded tanks and other products.

Another company showed a large welded tin mill cover that has been through 122 black heats and is good for many more.

Photographs of a number of large welded products of 18-8 chromium-nickel alloys showed effective application of welding in this comparatively new field. A number of large and heavy sections that had been thermit welded were also exhibited.

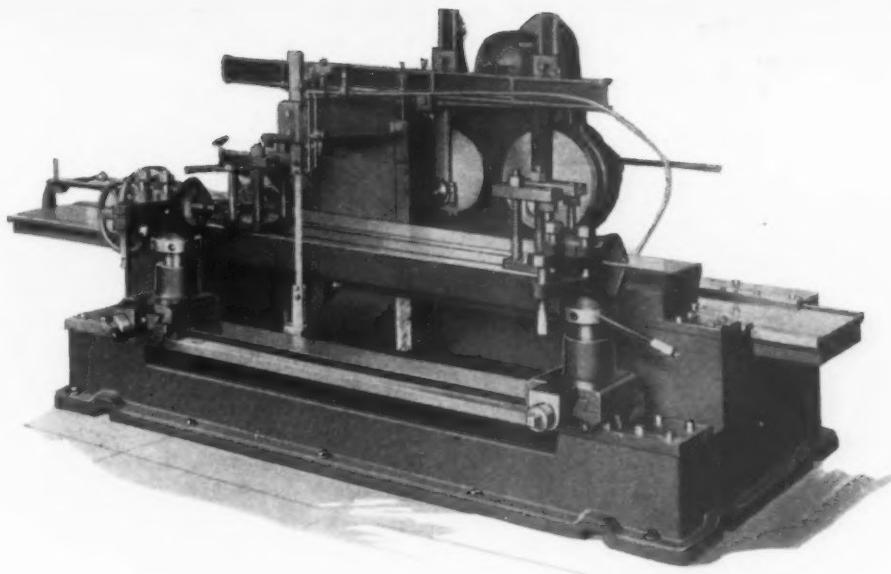
#### New Hard Alloy Cutting Tool

Tool, die and high-speed steels, displayed by 17 or more companies, formed an attractive section of the exposition. Tungsten-carbide tools included Carboloy, Firthite and Strauss metal, all of the cemented class; also Haystellite, the cast tungsten carbide.

Lathe and other cutting tools tipped with a new hard alloy named Vascoloy were introduced by a maker of high-speed, carbon and alloy tool steels. Of interest in connection with the claims for this material is that it is unusually adapted for turning steels. Other characteristics of this alloy, a fused product, will be described in later issues.

In addition to these extensive displays of cutting tool materials, lathe tools, drills, reamers, milling cutters and other small tools were exhibited by several companies. One company demonstrated a new drill in the drilling of forged manganese steel containing 11 to 13 per cent manganese, 1.20 per cent carbon. A 13/16-in. drill was used, drilling holes 1 in. deep, 25 holes per grind. The same company demonstrated its interchangeable punch and retainer system (described at length in *THE IRON AGE* of Sept. 11), on a No. 6 Bliss press, piercing four 0.411-in. holes in 5/16-in. stock.

Metal sawing machines of hacksaw, bandsaw and abrasive-wheel types, bar and billet shears, sanding, polishing and grinding equipment, and die sawing, filing and cutting machines were exhibited. A polishing wheel set-up machine, for which labor saving and increased life of wheels are claimed, was shown for the first time. Grinding wheels for all purposes, including snagging, were displayed, as well as electric rivet and bar heaters. A die-casting machine of large size, 12 x 16 in., together with a comprehensive exhibit of parts made on such equipment, was a center of interest.



## Special Saw Removes Wings From Clover-Leaf Billets

FOR a steel company that casts a three-wing billet of clover-leaf design, the Peerless Machine Co., Racine, Wis., has furnished the special metal sawing machine here illustrated.

The billet wings are of various dimensions up to 10 x 10 in. The billet, which is 4 ft. long, is placed lengthwise in the two vises in front of the long table, one wing resting on the

table. This wing is then clamped in the spring-equipped fixtures shown. The saw frame then moves longitudinally, carrying the reciprocating saw blade through the fin for a distance of 4 ft. or more. When cut off from the billet, the wing rests on the table. The billet is then turned over and the next wing removed in the same manner.

## Synchronous Motors for Varying Industrial Use

WIDESPREAD use of synchronous motors in industry dates from the time these motors were provided with squirrel-cage windings in the pole faces for starting, and were thus

able to start and accelerate to full speed with at least a part of their full load. Torques now available in synchronous motors have been largely enlarged

market for this type. Many applications, now driven by synchronous motors, were considered totally unsuited only a few years ago. Elimination of the need for clutches, and simplification of control made possible by full-voltage starting, have done a great deal to popularize their use.

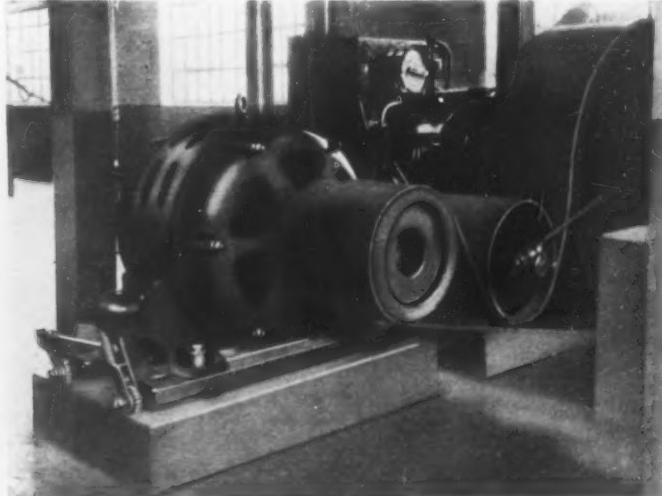
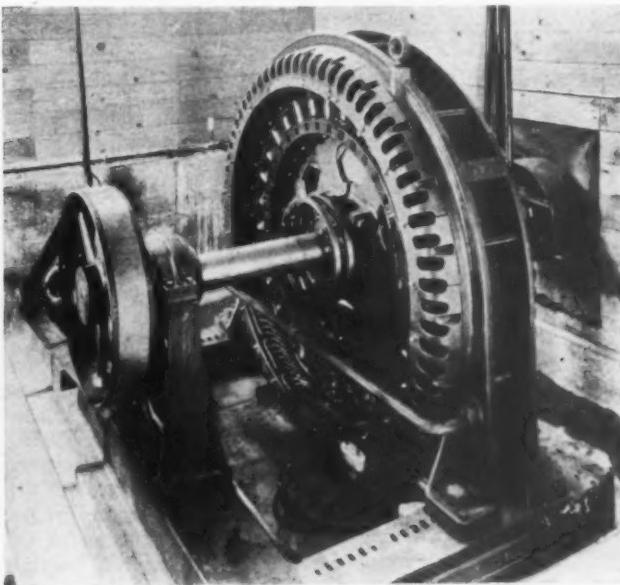
An extensive line of synchronous motors incorporating these operating features is being made by Fairbanks, Morse & Co., Chicago. This organization has broadened its line to cover ratings from 20 to 10,000 hp. in low and high-speed types. These motors have anti-friction bearings, and stators with cast semi-steel skeleton frame ends of boltless, nutless and threadless construction. Bolts and nuts, when applied to large heavy-duty rotating electrical machinery where vibrating problems are encountered, have been supplanted as one of the requirements of better construction.

The entire stator core is compressed evenly to the desired pressure by means of a powerful hydraulic press. While under this pressure the stacking pins are welded to form a flat countersunk head, which effectively prevents loosening or shifting of the core laminations.

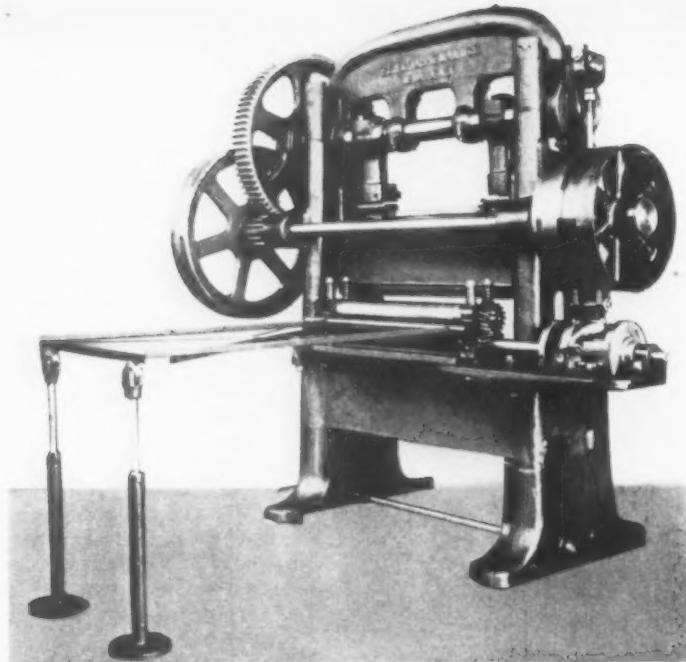
Liberal use of copper and iron has resulted in a balanced design and better than ordinary efficiencies, it is said, not only at full, but also at partial, loads. This important feature is reflected in economical operating costs of machinery which is in use for long periods at either full or part loads.

The starter is simple and requires no skill to operate. It is similar to the across-the-line starter used for small and medium-size induction motors.

But, in addition to the main-line magnetically-operated line switch and overload relay, it has a relay-actuated automatic field switch, which closes the field circuit at a predetermined point as the motor approaches synchronous speed. The field switch opens automatically when the motor stops.



The direct-drive unit is of 500 hp. at 240 r.p.m. The belted unit was applied to an existing compressor in an industrial plant, primarily for power factor improvement.



### Press for High-Production Blanking of Small Parts

TRANSFORMER laminations and other small parts can be blanked in large quantities on the double crank power press brought out by the Zeh & Hahnemann Co., Newark, N. J. Automatic roll feed is provided and the sheets may be cut without previous slitting, a feature emphasized as saving time and reducing waste of material.

Five dies are used and the press

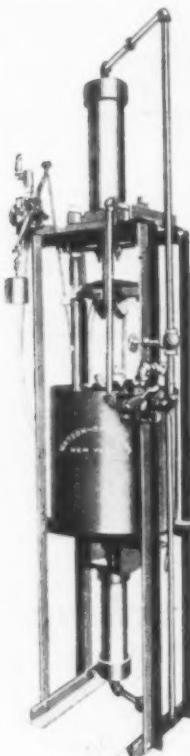
makes 50 strokes a minute, giving an output of 250 blanks a minute. The feed works on the stagger principle: Forward, punch; to the right, punch; forward, punch; to the left, punch; etc.

The distance between uprights is 48 in. and the machine will handle sheets up to 36 in. wide and 8 ft. long. The pressure exerted is 50 tons. The press weighs 10,000 lb.

Either belt or motor drive can be supplied; for the latter a 2 hp. motor, built into the machine, is employed. The same machine with 50-in. throat can be furnished; the 50-in. throat Unishear measures 3 x 7 x 9 ft. and weighs 7500 lb.

### Steam and Water Fittings Tested Rapidly

ALTHOUGH designed primarily for the rapid testing of brass steam and water fittings, the machine here shown, which is built by the Watson-Stillman Co., 75 West Street, New York, may be used also for fittings



### Unishear Will Cut 1/4-In. Material

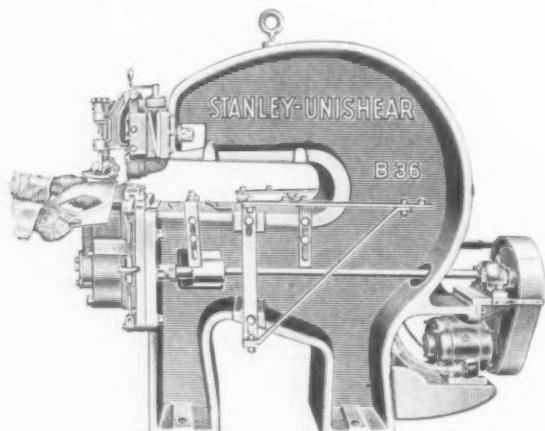
A TYPE B model of its Unishear with capacity for cutting steel boiler plate  $\frac{1}{4}$ -in. thick has been brought out by the Stanley Electric Co., New Britain, Conn.

The standard machine has a 36-in. throat, measures 2 x 6 x 6 ft., and weighs approximately 5500 lb. It will cut at speeds up to 10 ft. per min., depending upon how fast the operator guides the sheet through the shears, and even on the large sheets the op-

erator has a clear view and can follow easily and accurately the outline to be cut. Inside cuts can be started at any point within the sheet without making a "starting hole." Any type curve can be cut, as well as circles, with a minimum radius of 6 in. on  $\frac{1}{4}$ -in. material and less than 3-in. radius on lighter material. The machine will cut or trim the edges of flat stock to within less than the thickness of the sheet.

made of cast iron, malleable iron, cast steel and other materials. All fittings, 45 and 90 deg. elbows, street elbows, tees, crosses and return bends in sizes up to  $1\frac{1}{2}$  in. can be tested in one machine at an air pressure of 50 lb. per sq. in. under water with 90 lb. operating pressure. They can be tested either before or after tapping and at a speed of 500 to 600 per hour. This testing eliminates production work on defective castings and also tearing down time in installation costs.

In operating the machine the fitting to be tested is placed in a die on the lower platen. The valve at the right of the press controls the top double-acting piston, which on its down stroke clamps the fitting in the dies and forces the fitting under water in the tank. When the fitting is under the water, the air pressure is turned on automatically by the valve at the left on top of the frame. Reversing the valve at the right returns the top piston to the loading position.



*The standard machine with 36-in. throat cuts at speeds up to 10 ft. per min. Inside cuts can be started at any point*

# Steel Production Out of Line with Demand

BY LEWIS H. HANEY  
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

**T**HREE can be little question that raw steel has been produced in excess of finishing requirements.

During the first quarter, orders from consumers of finished steel showed a sharp spurt and ran much ahead of the last quarter of 1929. Perhaps this fact influenced the ill-advised attempt of that period to get business out of bed too soon. Orders for finished steel fell off in the second quarter, and in August reached the lowest point since 1924. This recession in buying reflects the facts as to the requirements of the steel-consuming industries, which, of course, must govern in the long run.

There was only a small, temporary increase in the activity of the chief steel-consuming industries in January and February. Since then the trend has been downward. In August the indicated current requirements continued the decline, falling considerably below the lowest point of 1924. This obviously explains the decline in orders for finished steel.

Meanwhile, however, no proportionate curtailment in steel ingot production has occurred. In August the average daily output actually increased more than usual for the season. The result is one of the largest discrepancies on our record between the outturn of raw steel and the indicated requirements for finished steel. This is the more difficult to understand in that the actual buying of finished steel and the unfilled orders of the Steel Corporation have fallen so low.

## Survey of Particular Industries

Is there any early prospect of a considerable increase in the actual requirements of steel-consuming industries?

Automobile manufacturers continue to curtail and to adjust their production to a reduced volume of sales. This fact is clearly illustrated by the decline in orders for malleable steel castings, which in August reached the lowest level since 1921, or early 1922. The head of the largest motor manufacturing

company has definitely stated his opinion that recovery will be slow. Certainly no turn is yet in sight.

Railroads show a continued recession in freight traffic and in earnings. The tonnage hauled in August increased less than seasonally, and current earnings reports afford little hope of increased railroad buying. The surplus of freight cars is the largest in many years and orders for equipment are disappointing.

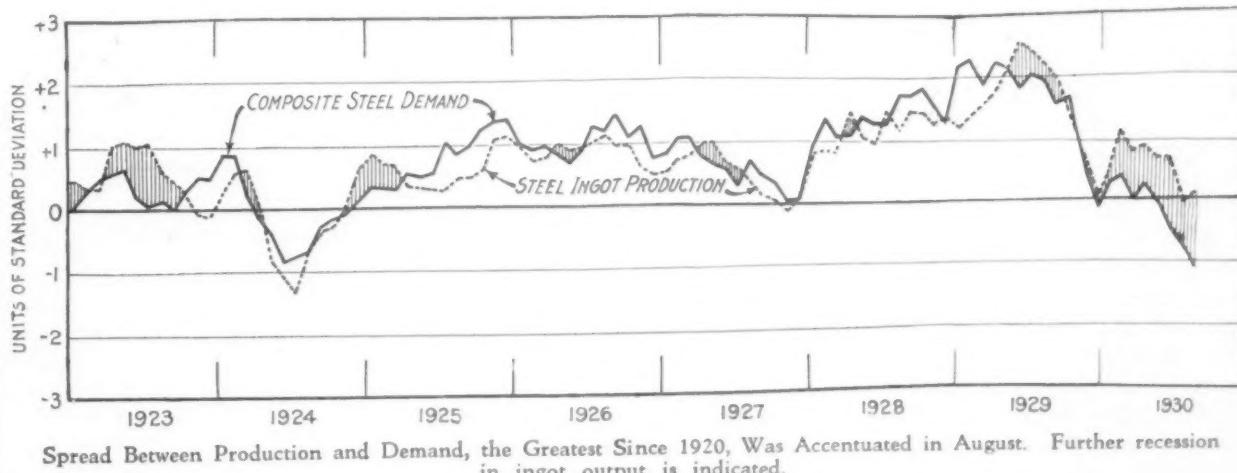
## Construction Contracts Reflect Over-Production

Building activity continues to "scrape bottom" and, in August, construction contracts awarded (floor space) were the lowest since July, 1921. Building permits declined also. As there is no doubt that this is a case of over-construction, the response to easy money and an improved bond market will be slower than usual. Hence the bookings of fabricated structural steel can show no sustained rise during the next few months, having already passed the seasonal peak. Current weekly estimates indicate lower levels.

Miscellaneous manufacturing activity has shown a steady downward trend since April. The trend is toward curtailment in the oil industry, and that trend is now reinforced by weakness in markets for refined oils. The present agricultural situation is not one to suggest hopefulness as to increased steel purchases by farmers. The condition of foreign markets is well known.

About the only bright spots in the statistics are the August increase in machine tool orders and the upturn in the P-V line. But the former increase was less than that which occurred in the same month in each of the three preceding years, and the latter barometer is still hesitant and much below normal.

It is difficult to escape the conclusion that over-production of raw steel exists and that further recession in ingot production will be required.



W. W. MACON  
*Editor*

# THE IRON AGE

A. I. FINDLEY  
*Editor Emeritus*

(ESTABLISHED 1855)

## Wheat and Business Recovery

**R**ESURGENCE of pronounced pessimism in Wall Street has thrown a wet blanket on general business sentiment. One need only suggest that improvement in trade is at hand and the answer given is, "Wheat." And if one has the courage to state that betterment is actually under way, the crushing retort is, "Wheat, corn, cotton, copper, South America, Hitler."

But low commodity prices and political disturbances are not unusual concomitants of a depression; nor do they mean the indefinite prolongation of poor business. As the *New York Times* points out in its financial column, every major economic reaction passes through three stages—panic on the stock exchange, decline in commodity prices and, finally, agricultural distress. "Rapidly falling markets for industrial products," it states, "came into view soon after the Wall Street crash of 1920, but the period of extreme mental depression (in the financial community) was not reached until wheat and cotton had gone in 1921 to pre-war prices."

It might be added that the lot of our farmers today, bad as it is, is far better than nine years ago, when a disastrous collapse of inflated land values accompanied the decline in crop prices. Yet the acute agricultural troubles of that period did not prevent industry from making slow, but steady, progress toward recovery. The turning point in iron and steel came as early as July, 1921, when production reached its lowest level. While it is true that business did not get back to normal in a single bound, the general trend, ignoring temporary setbacks, was upward the rest of the year and through 1922 until prosperity again came into full bloom in the year 1923.

If the lesson of those years means anything, it is a counsel of patience. Those who looked for full business recovery this fall will be disappointed. Still there is reason to hope that the betterment that has made its appearance to date will continue. This expectation is heightened by points of similarity in the iron and steel trade in the two depression years. In both 1921 and 1930 the low ebb in steel production was reached in July. In August, 1921, the Steel Corporation reported a decrease of 298,398 tons in its unfilled orders; this year it reported an August decline of 441,851 tons. In September, 1921, there was a gain of 28,744 tons in unfilled tonnage, followed by a decrease of 273,841 tons in October. The rate of steel ingot production in September, 1921, increased 9.3 per cent over that of August; the September gain over August this year may prove no greater and probably will be less. But the October increase over September in 1921 was 35 per cent and

this was followed by a further gain of 2.67 per cent in November. December showed the usual year-end falling off, after which there was an uninterrupted rise until July, 1922.

Improvement in the iron and steel trade in 1921 did not start with an increase in the consumption of metal, but rather with the necessity for replenishment buying, following exhaustion of inventories. Purchases of a similar character have been in evidence in the iron and steel market of late.

Betterment in production in 1921 did not prevent further recessions in prices. Advances occurred in pig iron and there were efforts also to stabilize finished steel prices, but November and December brought fresh reductions and the lowest prices of the depression were reached in February, 1922.

The course of business this year and next will not necessarily follow the pattern of the earlier period, but it seems entirely probable that progress toward business recovery will come in waves rather than in an uninterrupted rise of production and prices.

## Railroad and Utility Earnings

**W**HEN earnings of manufacturing and mining industries are falling sharply, one turns to the utilities and railroads to see what is happening to them. The Department of Commerce report on earnings of the utilities just issued for July contains a surprise, for the gross is above a year previous while there is a decline in net. The general trend in recent years has been for the net to increase less in dollars but more in percentage than the gross.

The utilities considered include gas, electric light, heat, power, traction and water and exclude telephone, telegraph and railway. Comparing full years, gross increased 5.5 per cent in 1928 and 3.5 per cent in 1929, while net increased 12.1 per cent and 15.9 per cent, respectively. Comparing the first seven months of this year with the same period of last, gross increased 3.0 per cent and net 3.5 per cent.

It is a notable thing that there should be any increase at all in gross this year and particularly an increase only a trifle under increases previously shown. Why the net thereupon had only a small increase relative to previous increases is not clear. From the bare figures the guess would be that there was an increase in unit operating costs.

Industrial production, freight car loadings and bank debits have been showing some progressive loss this year after allowance is made for seasonal variation and it is of interest to note the experience of the utili-

ties in this respect. Comparison of this year with last year is inadvisable as last year was particularly active in its middle part. Comparing receipts of the utilities this year with corresponding months of 1928, January showed a certain increase, February and March smaller increases, April and May slightly larger increases than January, and then June and July slipped off by increasing amounts. July showed only half the increase of January. The showing is particularly broad since part of the receipts come from business enterprises and part from households.

As to the railroads, the trend in net railway operating income was upward after 1920 through 1926. In 1927 there was a setback and in 1928 a partial recovery, whereupon 1929 passed 1926, thus becoming the best year. Comparing the first seven months of this year with the same period of last year there was a decrease of 33.1 per cent. The decrease in total operating revenue was only 13.2 per cent but operating expenses and taxes decreased by smaller percentages, whereby there was a large decrease in net. The operating ratio had a corresponding adverse movement, rising from 72.77 per cent to 76.38 per cent.

The showing for July tells an interesting story of increased rigidity in railroad economies. Operating revenue decreased from the preceding July by 18.2 per cent, or more than the seven-month average, but net railway operating income decreased barely more than in the seven-month period, 33.2 per cent against 33.1.

In substantially the whole range of activities, bank debits, car loadings, industrial production, utility earnings and railroad earnings, there is such a uniform showing, of losses this year from last, and increasing losses as the months of this year passed, that when the turn comes, as presumably it must, it will be quickly and plainly reflected, and the testimony will be perfectly trustworthy.

### Still Burning Gasoline

STATISTICS of gasoline consumption show that it is this year running ahead of 1929 and this is one of the most reliable of statistical series, inasmuch as it represents the payment of money. The increase occurs notwithstanding the growing vogue of light cars that use the minimum of gasoline per mile. We draw the conclusion that the use of automobiles has not been curtailed. On the other hand the manufacture of automobiles has shrunk sadly. We draw the conclusion that their makers surfeited the market in 1929. The conclusion is equally sound that when the accumulated stocks, including the second-hands, have been absorbed and more of the junks have to be withdrawn from the roads, there will be a renewed demand for these vehicles, which have become a necessity in our life.

### Steel Production Here and Abroad

THERE has been astonishing harmony between the swings of steel production here and the swings abroad. From 1928 to 1929 United States production increased 9 per cent while production in Great Britain, Germany, France, Belgium and Luxemburg increased 8.9 per cent. In the first seven months of this year the United States rate decreased 15.6 per cent from that of 1929, while the rate in the foreign countries decreased 12.6 per cent.

People are disposed to put it in the "believe it or not" column that trade in the United States is greatly and promptly influenced by what goes on abroad. They argue that, while one cannot see exactly why we should be so influenced, the facts speak for themselves. After all we are all human and peoples of various countries may do the same things without being greatly influenced by each other.

Whatever may have been the forces at work, it is clear that there were individual swings in the foreign countries, percentage increases in steel production 1928 to 1929 having been as follows:

#### Steel Production Increases, 1928 to 1929

United States .....	9.0
Great Britain .....	12.3
Germany .....	12.0
France .....	3.1
Belgium .....	4.1
Luxemburg .....	5.4

On account of much import and export business the changes in production in individual countries do not count for so much, the total being typical of the general swing in steel demand. Thus France had a small increase in production 1928 to 1929 but had a decrease in exports whereby the domestic consumption had a substantial increase. Germany, with a large increase in production, had a decrease in imports and an increase in exports, whereby domestic consumption increased but little.

Comparing the year 1929 and the first seven months of this year the percentage decreases are as follows:

#### Production Decreases, 1929 to 1930

United States.....	15.6
Great Britain .....	11.5
Germany .....	21.1
France .....	0.1
Belgium .....	10.2
Luxemburg .....	13.7

Germany's large loss is in domestic consumption, exports having decreased by a smaller percentage than production. France, with an insignificant decrease in production, had a decrease in exports, whereby the apparent domestic consumption actually increased this year. The average of the five foreign countries is the important thing, with a decrease of 12.6 per cent in their total tonnage of production, against 15.6 per cent in the United States.

Ordinarily a seven-month comparison of production here and abroad would not closely depict the situation because we have a seasonal swing to a low summer rate, not observable abroad, but this year the foreign countries have acted differently from usual, all of them having sharp decreases after March, which was the high month of the seven in all but Germany. Probabilities are that the figures for the entire year 1930 will make much the same comparison between here and abroad as is made by the seven-month comparison.

THREE of the recent developments in the engineering industries still are holding the spotlight. This was attested by the National Metal Congress in Chicago last week. They are the rustless and stainless steels, the nitriding process and the tungsten-carbide cutting tools. Increasing numbers show keen interest in the numerous applications. It is the advanced investigative stage that comes after skepticism or indifference has been dispelled.

# National Metal Congress Listens to Nearly 100 Papers

LEVEN years ago in Chicago a little band of steel treaters held a convention and exhibition in a South Side armory. It was the inauguration of what has come to be known as the American Society for Steel Treating. There was one chapter then. Today the still young society owns 38 chapters and local groups.

The 1930 convention and exposition in Chicago, last week, were held at the Stevens Hotel. Both from a technical and exhibition aspect, this year's gathering was a pronounced success, in view of business and other conditions. Participating, by holding sessions of some of their professional divisions, were the American Institute of Mining and Metallurgical Engineers, the American Welding Society and the American Society of Mechanical Engineers. Some idea of the magnitude of the technical programs is obtained from the accompanying table.

Society	Sessions	Papers
A.S.S.T. ....	10	39
A.W.S. ....	8	21
A.S.M.E. ....	8	18
A.I.M. and M.E. ....	7	20
Totals.....	33	98

## Three Notable Features

An experiment by the A.S.S.T. was a session on salesmanship. The attendance of nearly 700 overflowed the north ballroom of the hotel. Donald B. Clark, Firth-Sterling Steel Co., McKeesport, Pa., was chairman.

One of two particularly notable events in the technical program was the Campbell memorial lecture on "Oxygen in Steel" by Dr. Marcus A. Grossmann, a deliverance that has come to be a feature of the annual A.S.S.T. convention.

The other event was a joint session of the two divisions of the A.I.M. and M.E. on theoretical metallurgy. With Dr. S. L. Hoyt, General Electric Co., Schenectady, N. Y., as chairman and Dr. Grossmann as vice-chairman, three unusually important papers were delivered. They were: "Studies Upon the Widmanstaetter Structure, I—Introduction; also the Aluminum-Silver System and the Copper-Silicon System," by Robert F. Mehl and Charles S. Barrett; "Cemented Tungsten Carbide—A Study of the Action of the Cementing Material," by L. L. Wyman and F. C. Kelley; "Transformation of Austenite at Constant Subcritical Temperatures," by E. S. Davenport and E. C. Bain.

In the audience and partaking in the discussion were notables of physical metallurgy and chemistry. At the dinner of the A.I.M. and M.E. that same evening, Dr. Zay Jeffries characterized the papers at that session as landmarks in the study of the subjects treated.

## Nitriding and Stainless Steels Covered

Last year at Cleveland a notable symposium on nitriding was the feature of an all-day program. This year

this live subject was by no means neglected. The A.S.S.T. arranged a session of five papers and there were also two papers in the A.S.M.E. program. And the rustless or stainless steels were discussed.

## Sessions by Other Societies

An unusually successful gathering marked the annual fall meeting of the A.W.S. at the Congress Hotel. The 21 papers at the eight sessions covered several important subjects, including welding of rustless steel and a symposium on testing of welds.

Splendid programs were carried through by the two divisions of the A.I.M. and M.E. The 18 papers of the A.S.M.E. meetings embraced machine shop and steel industry problems.

## High Praise for the Campbell Lecturer

COMMENT was general and spontaneous that the Campbell memorial lecture this year—the fifth since its inauguration—was a notable contribution. It was delivered before a crowded assemblage of nearly 700 by Dr. Marcus A. Grossmann, Republic Steel Corporation, Canton, Ohio, on the subject "Oxygen in Steel." The facts and theories presented "form an epoch in the discussion" of this subject. A feature was the clarity and conciseness of its presentation.

In introducing Dr. Grossmann, Dr. Albert Sauveur, the chairman, himself

(Continued on page 973)



J. M. Watson



A. H. D'Arcambal



M. A. Grossmann



H. J. French

New president for 1931 is Mr. Watson, with Mr. D'Arcambal the new vice-president. Dr. Grossmann, delivered the Campbell memorial lecture and Mr. French was awarded the Howe medal.

# Demand for Finished Steel Loses Momentum

**B**USINESS in iron and steel is holding its recent gains, but has shown little further expansion. Reports from different market centers are not of one tenor and, while the balance is still on the side of betterment in demand, there is no clear indication of progressive improvement ahead.

The moderate increase in steel buying during the past month may prove to have been occasioned mainly by exhaustion of inventories rather than by any appreciable change in actual consumption. Much of the recent activity in both pig iron and finished steel has been centered in forward contracting, although willingness to make future commitments has been by no means general either as to products or districts. The contract tonnage that has been placed will prove effective in raising iron and steel output only to the extent that it is released for shipment.

In the case of sheets, unfilled tonnage was expanded sufficiently in September to warrant a rise of 15 or 20 points above the present 50 per cent rate of mill operations if material is specified fully and regularly during the coming quarter. But the flow of shipping orders, in the last analysis, will depend on the trend of iron and steel consumption.

With growth of steel demand arrested, ingot production remains unchanged at 61 per cent of capacity.

The loss of momentum in steel buying, possibly influenced by stock market pessimism, has been concomitant with a further divergence in price tendencies. Scrap markets are uniformly weak in tone, and heavy melting grade has declined 50c. a ton at Pittsburgh. On the other hand, bars are now being held at 1.65c. a lb., Pittsburgh, an advance of \$1 a ton, and recent advances of \$2 a ton on light plates and blue annealed sheets seem fairly well established. But attempts to raise automobile body sheets from 3.50c. to 3.60c. have thus far proved unsuccessful.

In the pig iron market, price recessions reported a week ago have been followed by further breaks, brought out by the appearance of the largest inquiries in months. Both basic and foundry grades are off 50c. a ton at Philadelphia, and Buffalo iron for delivery on the Atlantic seaboard has declined an equal amount.

The steel trade has not given up hope of a further gain in business during the coming month, although unwilling to estimate its extent. Recent releases

**P**RODUCTION Makes No Further Gain—Pig Iron Prices Decline on Eastern Seaboard—Scrap Off 50c. a Ton at Pittsburgh

against old rail contracts have been in encouraging volume, clearing the books of tonnage which the railroads were tardy in specifying. Fresh rail contracts from four major lines that bought a total of 300,000 tons last fall are soon to be placed, and will likely result in heavier rail mill operations at Chicago before the end of October. The Boston & Albany has purchased 1900 tons of tie plates, and the Baltimore & Ohio has entered the market for 50 locomotives.

Motor car production is apparently sensitive to every shift in retail sales. The Ford Motor Co. reduced its operations to a three-day basis last week and may continue on that schedule during the current week. On the other hand, the Chevrolet foundry at Saginaw, Mich., got into production on Sept. 22 and its operations in the next 30 days will be heavy. Other departments of the Chevrolet company are speeding up also, in an effort to put new models on the market by Nov. 1. It is largely because of this organization's increased activity that total automobile output for the coming month is expected to prove a little larger than that of September.

Demand for wire products has turned upward in the Chicago district with a corresponding improvement in wire mill operations. Tin mill operations are beginning to react to seasonal influences, now averaging 65 per cent for the country at large. Fabricated structural steel awards, at 15,000 tons, were the smallest to date this year, while new projects, at 24,000 tons, were below average. Lettings of reinforcing steel, totaling 10,850 tons, were the largest since May.

Iron and steel exports in August, at 151,235 tons, made the first gain since March, the increase over the July total being 19,463 tons. The figures for September will be awaited with particular interest, since it is feared that political disturbances in South America have adversely affected shipments to that continent.

Copper, in dropping to 10c. a lb., delivered Connecticut valley, reached the lowest price in 34 years. Spot straits tin has been sold at 28.62½c., the lowest price since March, 1922.

THE IRON AGE composite price for finished steel has advanced from 2.149c. to 2.156c. a lb. Pig iron has declined from \$16.46 to \$16.38 a gross ton. The scrap composite has receded from \$13.75 to \$13.58 a gross ton.

# PITTSBURGH

## No Definite Upturn in Steel Business— Scrap Prices Decline

PITTSBURGH, Sept. 30.—September business in the steel industry, while it may have added considerably to order books, has not yet given the industry sufficient momentum to bring about a definite upturn. In the Pittsburgh district operations have shown no gain during the entire month, with one or two minor exceptions. A small independent plant, which began the month with open-hearth capacity unoccupied, is now running four furnaces, but other independents have done well to maintain recent averages. The leading interest has maintained its output at about the level which prevailed early in the month.

Specifications last week for sheets, strip steel and other light products were not maintained at the comparatively high level which prevailed in the second and third weeks of September. Consequently, the gain in tonnage releases in the past month has not been as marked as was indicated by earlier comparisons. On the other hand, improvement in demand for bars, plates and shapes seems still to be in evidence, and may likely be reflected in next month's operating schedules. Considerable structural steel business is being placed, and more activity is reported in the barge market. Valley mills have also booked a fair amount of plate tonnage for oil tanks. Electric welded pipe mills in that district are drawing heavily on plate mills for their skelp. The railroads have not yet started to buy in any significant volume, and the outlook for automobile steel is further clouded by a reduction in the operating schedule of the largest maker last week.

Miscellaneous consumers of steel in many cases have covered their needs for the remainder of the year.

The price situation is somewhat clouded. Although the market still seems inclined to show strength rather than weakness, on some products this probably arises from the fact that the principal consumers are now covered for the remainder of the year and have withdrawn from the market. In many cases such business was taken at price concessions, and mills have adopted a firmer stand on business which is coming out now. Some of them feel backlogs accumulated recently justify a stronger adherence to current quotations, but others are not so certain that this tonnage will be specified before the end of the quarter. Bars have probably shown the most marked tendency toward strength in recent weeks, and the 1.65c., Pittsburgh, quotation may be considered the general market. Likewise 1.60c. is better established on plates and shapes. Prices on black and blue annealed sheets are also stronger, but

Although there have been some gains in steel orders in September, there is no definite upturn in plant operations.

Price situation still clouded. Bars are firmer, but shading occurs on sheets in some districts.

Heavy melting steel scrap off 50c. a ton, and other grades are also lower.

Recent declines in pig iron prices have not stimulated buying.

Further curtailment of blast furnace operations in the Valleys.

reports of shading in other districts continue, even on current spot business.

Pig iron reflects no improvement from the standpoint of advance orders, and shipments have gained only in isolated cases. The recent price decline apparently did not stimulate buying, and the present quotations are still essentially small-lot figures. Heavy melting scrap has declined 50c. a ton in the absence of further mill buying to support the recent quotations, and dealers are offering tonnage at even lower figures.

### Semi-Finished Steel

No change is reported in this market, which has not reflected recent improvement in buying of finished steel products. Shipments during September showed only a limited increase over the preceding month, and new buying is negligible. Users of forging billets have generally contracted for the fourth quarter at \$36, Pittsburgh, while the same is true in the case of wire rods. Low operations of bolt and nut makers and other large rod users have restricted shipments, although moderate improvement this month over August is reported by most sellers. The price seems to be well maintained.

### Pig Iron

Recent declines of \$1 a ton on basic iron and 50c. on the other grades have not stimulated buying in this district, and business is still confined to small orders for immediate shipment. Foundries in the district are generally operating only two or three days a week, and are covering their needs from

hand to mouth. Following the recent large sale of basic iron to a non-integrated steel company, the basic market is again without feature. Most of the other large basic users are tied up by contract with their sources of supply, and it is difficult to determine whether the present \$17, Valley, price would stand the test of further heavy buying. Blast furnace production has reached the lowest point in years, with further curtailment of operations in the Valleys following the blowing out of the second Shenango stack. The furnace of the Sharon Steel Hoop Co. has been taken out for relining, while one of the Hubbard furnaces of the Youngstown Sheet & Tube Co. is temporarily banked.

Prices per gross ton, f.o.b. Valley furnace:	
Basic .....	\$17.00
Bessemer .....	18.00
Gray forge .....	17.00
No. 2 foundry .....	17.50
No. 3 foundry .....	17.00
Malleable .....	18.00
Low phos., copper free .....	\$26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:	
Basic .....	\$17.50
No. 2 foundry .....	18.00
No. 3 foundry .....	17.50
Malleable .....	18.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

### Bars, Plates and Shapes

Prospective business in fabricated structural material is still the feature of heavy hot-rolled products. Local fabricators are figuring on more jobs than they have had at any time during the year, and a number of awards are being made. Highway bridges are accounting for more tonnage than any other one outlet just now, as industrial and office building construction is very limited in the immediate Pittsburgh district. Bids will be taken Sept. 22 on a viaduct at Cincinnati, which will take 5000 tons of shapes. A boulevard bridge at Pittsburgh for the State will take 760 tons. The Gulf Refining Co. has not yet acted against its recent barge inquiry, and there is a possibility that the original plans to buy only six barges will be changed to a larger number.

One steel company in the district is reported to be considering barge purchases before the end of the year, and it is said that an independent barge line may soon be in the market for as many as 40 units. Otherwise, actual inquiry is rather scanty, although local builders are figuring on a few single barges. Demand for plates is rather dull, particularly because of the inactivity of car building plants in this district. Some material is going to oil tank fabricators, and ac-

## A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Sept. 30, 1930	Sept. 23, 1930	Sept. 2, 1930	Oct. 1, 1929	Sept. 30, 1930	Sept. 23, 1930	Sept. 2, 1930	Oct. 1, 1929
No. 2 fdy., Philadelphia.....	\$18.76	\$19.26	\$19.76	\$21.26	Per Lb. to Large Buyers:	Cents	Cents	Cents
No. 2, Valley furnace.....	17.50	17.50	18.00	18.50	Sheets, black, No. 24, P'gh...	2.45	2.45	2.40
No. 2 Southern, Cin'ti.....	15.19	15.19	15.69	17.19	Sheets, black, No. 24, Chicago	2.55	2.55	2.50
No. 2, Birmingham.....	14.00	14.00	14.00	14.50	dist. mill.....	3.00	3.00	3.50
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	20.00	Sheets, galv., No. 24, P'gh.....	3.10	3.10	3.60
Basic, del'd eastern Pa.....	17.75	18.75	18.75	19.75	Sheets, galv., No. 24, Chicago	2.15	2.05	2.35
Basic, Valley furnace.....	17.00	17.00	18.00	18.50	dist. mill.....	2.25	2.25	2.45
Valley Bessemer, del'd P'gh.....	19.76	19.76	20.26	20.76	Sheets, blue, No. 13, P'gh.....	2.00	2.00	2.45
Malleable, Chicago*.....	17.50	17.50	17.50	20.00	Wire nails, Pittsburgh.....	2.10	2.10	2.50
Malleable, Valley.....	18.00	18.00	18.50	19.00	Plain wire, Pittsburgh.....	2.30	2.30	2.40
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04	Plain wire, Chicago dist. mill.....	2.35	2.35	2.45
Ferromanganese, furnace.....	94.00	94.00	94.00	105.00	Barbed wire, galv., Pittsburgh	2.70	2.70	3.10
Rails, Billets, Etc., Per Gross Ton:					Barbed wire, galv., Chicago	2.85	2.85	3.15
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00	Tin plate, 100 lb. box, P'gh.....	\$5.25	\$5.25	\$5.35
Light rails at mill.....	36.00	36.00	36.00	36.00				
Rerolling billets, Pittsburgh.....	31.00	31.00	31.00	35.00				
Sheet bars, Pittsburgh.....	31.00	31.00	31.00	35.00				
Slabs, Pittsburgh.....	31.00	31.00	31.00	35.00				
Forging billets, Pittsburgh.....	36.00	36.00	36.00	40.00				
Wire rods, Pittsburgh.....	36.00	36.00	36.00	40.00				
Skelp, grvd. steel, P'gh, lb...	1.70	1.70	1.70	1.85				
Finished Steel,								
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents				
Bars, Pittsburgh.....	1.65	1.60	1.60	1.90				
Bars, Chicago.....	1.70	1.70	1.75	2.05				
Bars, Cleveland.....	1.65	1.65	1.70	1.95				
Bars, New York.....	1.98	1.98	1.93	2.24				
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.95				
Tank plates, Chicago.....	1.70	1.70	1.75	2.05				
Tank plates, New York.....	1.88	1.88	1.88	2.22 1/2				
Structural shapes, Pittsburgh.....	1.60	1.60	1.60	1.90				
Structural shapes, Chicago.....	1.70	1.70	1.75	2.05				
Structural shapes, New York.....	1.85 1/2	1.85 1/2	1.80 1/2	2.19 1/2				
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.30				
Hot-rolled strips, Pittsburgh.....	1.65	1.65	1.65	1.90				
Cold-rolled strips, Pittsburgh.....	2.35	2.35	2.35	2.75				
Old Material, Per Gross Ton:								
Heavy melting steel, P'gh.....	\$15.25	\$15.75	\$15.50	\$17.75				
Heavy melting steel, Phila.....	13.00	13.00	13.00	16.00				
Heavy melting steel, Ch'go.....	12.50	12.50	12.50	14.50				
Carwheels, Chicago.....	13.50	13.50	13.50	14.00				
Carwheels, Philadelphia.....	15.00	15.00	15.00	16.50				
No. 1 cast, Pittsburgh.....	13.50	13.50	13.50	15.50				
No. 1 cast, Philadelphia.....	18.00	18.00	13.00	16.00				
No. 1 cast, Ch'go (net ton).....	11.00	11.00	12.00	14.50				
No. 1 RR. wrot, Phila.....	15.00	15.00	15.00	16.00				
No. 1 RR. wrot, Ch'go (net).....	10.00	10.00	10.00	14.00				
Coke, Connellsville,								
Per Net Ton at Oven:								
Furnace coke, prompt.....	\$2.60	\$2.60	\$2.60	\$2.65				
Foundry coke, prompt.....	3.50	3.50	3.50	3.75				
Metals,								
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents				
Lake copper, New York.....	10.12 1/2	10.50	11.12 1/2	18.12 1/2				
Electrolytic copper, refinery.....	9.75	10.25	10.50	17.75				
Tin (Straits), New York.....	28.75	29.75	29.75	44.25				
Zinc, East St. Louis.....	4.25	4.25	4.85	6.80				
Zinc, New York.....	4.60	4.60	4.70	7.15				
Lead, St. Louis.....	5.35	5.35	5.25	6.70				
Lead, New York.....	5.50	5.50	5.50	6.90				
Antimony (Asiatic), N. Y....	7.50	7.62 1/2	7.75	8.50				

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

tivity is well sustained at a few mills by the heavy skelp requirements of pipe makers.

Steel bars continue very dull, at least from the standpoint of production and specifications. Forward buying has been more active, and most of the contract buyers in this territory are now covered for the remainder of the year. The price is now very well maintained at 1.65c., Pittsburgh, the lower figure which has been quoted recently having practically disappeared so far as current business is concerned. Although it is admitted that a substantial part of fourth quarter shipments will not take that price, the market is now quotable on a flat 1.65c. basis. Plates and shapes are also better maintained at 1.60c., and the market reflects a generally steadier tone.

### Rail and Track Supplies

Specifications have been heavier as the quarter approaches its end, and negotiations are under way for fourth quarter contracting. The rail buying movement has not yet appeared, although the Pere Marquette is inquiring for its 1931 requirements. Other roads are expected to come into the market during October.

### Tubular Goods

The pipe market has not benefitted materially from the improved business in other steel lines since the first of the month, although a few makers report a slightly heavier demand for butt-weld goods. This does not indicate any substantial improvement in building operations, but follows a rather general seasonal trend. No new line pipe orders are reported, and projects under consideration are being postponed until next season. The leading interest has sufficient line pipe business on its books to maintain a steady operating rate over the remainder of the year, but the independents are scarcely as well supplied with orders. Demand for oil country goods is unsatisfactory, and other lines, such as mechanical tubing and boiler tubes, are quiet.

### Wire Products

Specifications for manufacturers' wire still reflect improvement, but light demand from the automobile industry discourages any sharp upturn in business. Some jobbers are stocking up on merchant wire products, although demand is far from rushing. Fourth quarter quotations on staples and galvanized barbed wire indicate

an advance of 10c. a 100 lb. in the differential over nails at which such goods are sold. The price of nails is generally maintained in this district at \$2 a keg, Pittsburgh, and shading from outside sources is less frequently reported.

### Sheets

The principal activity in this market still is centered in forward buying. Current specifications have not been sufficient to justify any marked improvement in operations. The leading interest ran its mills last week at about 51 per cent of capacity and the average for independent companies was not over 50 per cent. Minor increases are scheduled at some plants this week, but are not sufficient to make much of a change in the aggregate operating rate of the industry. The addition to unfilled sheet orders during September has undoubtedly been of considerable size and, if the material is specified with regularity during the fourth quarter, operations should improve 15 to 20 points. The prospect of regularity in specifying depends entirely upon the business of consumers and thus is none too good. Also steel companies as a whole are not very well protected in their con-

## THE IRON AGE COMPOSITE PRICES

Sept. 30, 1930  
One week ago  
One month ago  
One year ago

### Finished Steel

2.156c. a Lb.	
2.149c.	
2.142c.	
2.384c.	
<i>Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.</i>	
<b>HIGH</b>	<b>LOW</b>
2.362c., Jan. 7; 2.142c., Aug. 26	
2.412c., April 2; 2.362c., Oct. 29	
2.391c., Dec. 11; 2.314c., Jan. 3	
2.453c., Jan. 4; 2.293c., Oct. 25	
2.453c., Jan. 5; 2.403c., May 18	
2.560c., Jan. 6; 2.396c., Aug. 18	

### Pig Iron

\$16.38 a Gross Ton
16.46
16.88
18.29

*Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.*

### Steel Scrap

\$13.58 a Gross Ton
13.75
13.67
16.08

*Based on heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.*

<b>HIGH</b>	<b>LOW</b>
\$15.00, Feb. 18;	\$13.08, July 1
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22
17.25, Jan. 5;	14.00, June 1
20.83, Jan. 13;	15.08, May 5

tracts and many of them no longer have clauses forcing buyers to order out the steel before the end of the quarter. As considerable business has been taken at price concessions, the progress which has been made in price stabilization this month may be nullified unless unspecified tonnages are cancelled.

Prices today are steadier than they have been for some time on the common finishes of sheets. Current buying of black sheets is at 2.45c., Pittsburgh, with scarcely any exceptions, while light plates and blue annealed sheets are well maintained at 2c. and 2.15c. Galvanized material is quotable at 3c. to 3.10c., the lower figure applying to large jobbers. Automobile body sheets are not so well defined, with business going at 3.50c. to 3.60c.

### Strip Steel

Further depressing reports from the automobile industry have not improved the sentiment of strip makers in the last week, and no additional gains in specifications are reported. In some instances encouraging improvement in the first two or three weeks of the month was not continued last week and the average gains over August were cut down. A fair average of the increase would be 10 per cent, while earlier in the month a number of companies were 20 per cent ahead of the corresponding August period. Nevertheless, prices have held fairly well and are currently steady except in one or two districts. Considerable contract business was taken at lower figures than are the quotable market today. Hot-rolled strip is quotable at 1.65c., Pittsburgh, for the wider sizes and 1.75c. for the narrow widths, while cold-rolled material is well maintained at 2.35c. to 2.45c.

### Cold-Finished Steel Bars

The cold-finishing industry has not had much increase in business this month because of the predominant part of its tonnage which goes to the automobile industry, whose share is estimated at as high as 75 per cent when parts makers as well as motor car builders are considered. Slightly heavier releases are coming from the agricultural implement makers, but this business has not improved as much as usual. Other lines are dull and aggregate business in cold-fin-

ished bars this month has not gained materially over that of August. The price is well maintained at 2.10c., Pittsburgh.

### Tin Plate

Tin plate operations have begun to react to the usual seasonal downturn, the average for the industry now being not much above 65 per cent. However, shipments to container manufacturers are still heavy in some parts of the country as packing operations have been extended past the usual time in an effort to make up shortages elsewhere.

### Coal and Coke

Further curtailment in blast furnace operations in this and the Valley districts has brought added grief to furnace coke makers and oven operations are lower. Prices are holding at \$2.60 to \$2.65, Connellsville. Colder weather has stimulated demand for domestic coke, and some sellers are advancing prices. The coal market is burdened by considerable material on tracks without destination, and prices are weak. This is particularly true

### Warehouse Prices, f.o.b. Pittsburgh

*Base per Lb.	
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.85c.
Light plates, blue annealed (No. 10), 1 to 24 plates	2.50c.
Blue annealed sheets (No. 13) square	2.65c.
Galv. corrug. sheets (No. 28), per square	4.25c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.30
Wire, black, soft ann'd, base per 100 lb.	\$2.60 to 2.70
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.65 to 2.80

\*On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

in the case of steam slack, which has declined sharply in the last few days.

### Old Material

No. 1 heavy melting steel has declined 50c. a ton in the absence of mill purchases. Even the present quotation of \$15 to \$15.50 is nominal, as one mill has been offered scrap in comparatively heavy tonnage at \$15 and has refused to buy. The same is true in the case of hydraulic compressed sheets, which are also off 25c. a ton. Dealers have generally covered recent high-priced orders for steel and bundles with the result that it is even difficult to arrive at a dealers' buying price in the present market. Some material is being picked up at \$15 or less, but not enough dealers are in the market to establish any definite buying figures. Blast furnace grades have declined 25c. a ton, and a market for machine shop turnings is still lacking. The closing of the Pennsylvania list on Oct. 1 is expected to establish a price for No. 1 heavy melting steel, although this might normally bring a higher figure than mills are willing to pay for less desirable material. The Baltimore & Ohio list, closing on Oct. 6, contains 8700 tons.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	\$15.00 to \$15.50	
No. 2 heavy melting steel	12.50 to 13.00	
Scrap rails	14.50 to 15.00	
Compressed sheet steel	14.75 to 15.25	
Bundled sheets, sides and ends	12.50 to 13.00	
Cast iron carwheels	14.50 to 15.00	
Sheet bar crops, ordinary	15.50 to 16.00	
Heavy breakable cast	11.00 to 11.50	
No. 2 railroad wrought	15.00 to 15.50	
Hvy. steel axle turnings	12.50 to 13.00	
Machine shop turnings	8.00 to 8.50	
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	17.50 to 18.00	
Railr. coil and leaf springs	17.50 to 18.00	
Rolled steel wheels	17.50 to 18.00	
Low phos. billet and bloom ends	20.00 to 21.00	
Low phos. mill plates	17.00 to 17.50	
Low phos. light grades	17.00 to 17.50	
Low phos. sheet bar crops	18.00 to 18.50	
Heavy steel axle turnings	12.50 to 13.00	
Electric Furnace Grades:		
Low phos. punchings	17.00 to 17.50	
Heavy steel axle turnings	12.50 to 13.00	
Blast Furnace Grades:		
Short shoveling steel turnings	8.50 to 9.00	
Short mixed borings and turnings	8.50 to 9.00	
Cast iron borings	8.50 to 9.00	
Rolling Mill Grades:		
Steel car axles	21.50 to 22.50	
Cupola Grades:		
No. 1 cast	13.00 to 14.00	
Rails 3 ft. and under	16.50 to 17.00	

# CHICAGO

## Steel Orders and Operations Gain Slightly— Further Expansion Expected This Month

**C**HICAGO, Sept. 30.—Although the general business situation is still clouded, there are a number of developments in the iron and steel market that are distinctly encouraging. Prices appear to have a better footing, which is rather a satisfactory condition in view of the current rate of consumption. It is evident that consumers are giving closer attention to future needs as they may relate to present quotations. Fourth quarter contracting is moving forward at a fair stride, and it is significant that inquiries, which are present in an attractive aggregate tonnage, are in some cases reaching beyond the end of 1930. Both specifications and sales of finished steel are well up to the total of the previous week, when gains were made, and shipments are registering improvement.

Steel mills continue to blow only 16 of 36 blast furnaces, but open-hearth output has gained at least one point to an average of 59 per cent for the district.

Specifications for wire and wire products showed improvement in the final week of September, and releases at hand point to further betterment in the early part of October. Of special significance are heavier rolling schedules at hot mills, which now are producing in the range of 60 to 65 per cent of capacity, a gain of at last five points in the week. Bar mill products are in stronger demand for widely diversified uses.

Reviewing the situation as a whole the Midwestern steel market enters October after an improvement in September and with fair assurance that the tonnage to be moved in October will show further growth.

### Plates

Improvement in the Western plate market is slow to take shape. Specifications from car shops are the lightest in some time, and it is quite evident that production schedules on railroad cars are at the lowest point of the year. This situation in itself would not be so bad were it not for the fact that there is no new business of moment in sight.

Further, there is a strong disposition for railroads to confine their narrow wants to their own shops, where operations have been curtailed rather sharply in recent months. Examples of movements of this kind are announcements that the Burlington will build 10 baggage cars in its own shops and that the Milwaukee road will build 10 mail and baggage cars at its Milwaukee shops. The 50 tank cars recently inquired for by the Tennessee Copper Co. will be constructed and leased by the General Tank Car

Moderate improvement of September in steel orders and operations expected to extend through October.

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Inquiries are increasing in number, some calling for deliveries into 1931.

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Open-hearth operating rate has gained one point to 59 per cent of Chicago district capacity.

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Bar mill products in stronger demand for widely diversified uses.

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Pig iron shipments in September fully 15 per cent larger than those of August.

Corp. Orders similar to the above give a good general picture of the railroad equipment market, which at present seems to be drifting aimlessly without chance of recovery during the remainder of this year. Car business usually develops slowly, and it is not uncommon to see 60 or more days pass from the time that inquiries are made until actual work begins in shops. With inquiries at low ebb, no encouragement for 60 to 90 days can be drawn from this market.

The pipe market is leaning heavily on past commitments. Shipments of plates to the Milwaukee pipe fabricator are still in good volume, and releases at hand are promising for a number of weeks to come. Sinclair interests are planning a new oil line to extend from Oklahoma City to Coffeyville, Kan. The tank market is listless, with 20,000 tons overhanging from recent inquiries.

### Pig Iron

September has come to a close with shipments of Northern foundry iron fully 15 per cent heavier than in the preceding month and shipping instructions now in the hands of sellers give assurance that October deliveries will show further improvement. Production is still confined to four merchant stacks, which are operating below rating as measured by the current rate of shipments. Prices remain steady at \$17.50 a ton, local furnace. New buying remains in substantial volume, while inquiries, sometimes far ahead as the first quarter and even the first half, are increasing in volume. A user in this district has taken upward of 1000 tons of low phosphorus iron at a shade under \$28.50 a ton, delivered Chicago. In view of general conditions, the local

pig iron market shows satisfactory improvement.

#### Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
to 2.75	18.00
Malleable, not over 2.25 sil	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	27.04
S'th'n No. 2 fdy.	17.51
Low phos., sil. 1 to 2, cop- per free	\$28.50 to 29.20
Silvery, sil. 8 per cent	26.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

### Structural Material

Building construction in the Middle West remains quiet. It is reported that Western banks are quicker to renew mortgages than has been their practice in recent months and that more money is available for home building, which appears to be expanding. It is hoped by the trade that changes in attitude of money lenders may lead to larger building programs, but neither fabricators nor mills hold out much hope for business during the remainder of this year. Midland Structural Steel Co., Chicago, is low bidder on 2700 tons for the Steinmetz School.

### Wire Products

As is to be expected at this time of the year, demand for wire and wire products is turning upward. Releases and new orders entered for immediate shipment show gains both from the jobbers and from the manufacturing trade. Wire mill operations stand close to 50 per cent of capacity and the outlook is that further gains will be made as October advances. Prices here are relatively steady at \$2.10 a keg for common nails and at 2.35c. a lb. for wire to the manufacturing trade.

### Rails and Track Supplies

At least three major Western railroads and one line operating between Chicago and New York are said to have completed budgets and are near the point where they will ask for prices on standard-section rails. These same railroads bought close to 300,000 tons of rails last fall. On the score of these prospective rail purchases, local producers are looking forward to heavier mill operations during the last half of October. Specifications against old commitments have been in fair volume, with the result that books are well cleared, thus rectifying a situation which existed earlier in the year when railroads were unusually tardy in releasing

against their contracts. Inquiries by the Pere Marquette and the Great Northern are still before the trade.

*Prices f.o.b. mill, per gross ton:* Standard section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel plate, 2.07½c. to 2.15c.; angle bars, 2.75c.

### Cast Iron Pipe

The Glamorgan Pipe & Foundry Co. is low bidder at \$44.40 a ton on 1000 tons of 16-in. Class C pipe for Milwaukee. This is equivalent to \$36 a ton, Birmingham. The award, however, is being held up because earlier in the year Milwaukee purchased pipe at \$1.90 a ton below this figure. The quantities sought on both occasions were about the same, and the city officials are taking time to investigate the reasons for the higher price this fall. A contractor has entered an order for 700 tons of pipe, and several inquiries from like sources are before the trade.

*Prices per net ton, deliv'd Chicago:* Water pipe, 6-in. and over, \$43 to \$45; 4-in., \$41 to \$48; Class A and gas pipe, \$3 extra.

### Sheets

Both new buying and specifications continue to make headway, with the result that hot mill operations have been advanced to 60 or 65 per cent of capacity. This is the best showing made by local producers in several months. Even roofing has come back to life, though sellers had about given up hope that a fall increase would occur. Distribution is wider by warehouses, and many manufacturers are rounding out depleted stocks and taking added quantities for immediate use. Mills are able to supply much roofing from stock. Other grades of sheets may be entered for prompt rolling.

*Base prices per lb., deliv'd from mill in Chicago:* No. 24 black sheets, 2.60c.; No. 24 galv., 3.15c. to 3.25c.; No. 10 blue ann't'd, 2.15c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

### Reinforcing Bars

The burden of sustaining tonnage in this market still rests on road building activities. Fresh inquiries, except for lots of less than 100 tons each, are disappointing to the trade, and word from architects lends no encouragement for the fall months. Shop operations are suffering under conditions of this kind and, odd as it may seem, dealers are experiencing delays in shipments on small tonnages which they have not been able to put through shops on schedule. This clearly indicates that shop personnel has been cut to the bone, giving little or no leeway to afford flexibility in meeting emergencies. The situation is so acute as to large tonnages that prices for billet bars for building purposes have dropped to 1.75c. a lb. out of warehouse.

### Bars

Specifications for mild steel bars again show a gain, this being the second consecutive week in which users'

needs have expanded. In fact, shipments in September are fully 20 per cent heavier than in the preceding month, and inquiries now at hand foretell further expansion in October. Interest in fourth quarter requirements is growing and sellers are well encouraged in view of a number of large inquiries. Several agricultural machinery manufacturers are now taking inventory because they are about to close the fiscal year. Releases of steel for export orders of tractors are in fair volume, but the use of steel for products to be placed on the domestic market is dragging. Road machinery builders continue to specify regularly and in good volume.

The iron bar market is quiet, with the price at 1.70c. a lb. Demand for alloy steel bars is making slow headway in spite of dullness in automobile plants. Output of alloy bar mills in this district averages 50 per cent of capacity, which is a slight gain over production a week ago. Both inquiries and sales of rail steel bars are making slow headway. Few users are willing to make commitments for the future, with the result that orders are being entered for immediate shipment.

### Bolts, Nuts and Rivets

A better tone rules in this market because of the fact that several manufacturers of agricultural machinery have entered larger specifications and several others are talking more encouragingly about the prospects of swinging into production about Nov. 1 on equipment which must be ready for shipment in the spring.

### Coke

Shipments of by-product foundry coke are keeping pace with the gradual growth in melt of pig iron. The price remains steady at \$8 a ton, f.o.b. local ovens.

### Warehouse Prices, f.o.b. Chicago

	Base per Lb.	
Plates and structural shapes	3.00c.	
Soft steel bars	2.90c.	
Reinfor'g bars, billet steel—		
Less than 5 tons	2.85c.	
5 tons to 30 tons	2.45c.	
30 tons to 200 tons	2.00c.	
200 tons and over	1.75c.	
Rail steel reinforcement—		
Less than 5 tons	2.50c.	
5 tons to 30 tons	2.10c.	
30 tons and over	1.50c.	
Cold-fin. steel bars and shafting—		
Rounds and hexagons	3.35c.	
Flats and squares	3.35c.	
Bands ( $\frac{1}{4}$ in. in Nos. 10 and 12 gages)	3.10c.	
Hoops (No. 14 gage and lighter)	3.65c.	
Black sheets (No. 24)	3.80c.	
Galv. sheets (No. 24)	4.35c.	
Blue ann't'd sheets (No. 10)	3.35c.	
Spikes ( $\frac{1}{4}$ in. and larger)	3.55c.	
Track bolts	4.55c.	
Rivets, structural	4.00c.	
Rivets, boiler	4.00c.	
	Per Cent Off List	
Machine bolts	60 and 10	
Carriage bolts	60 and 10	
Coach or lag screws	60 and 10	
Hot-pressed nuts, sq., tap. or blank,	60 and 10	
Hot-pressed nuts, hex., tap. or blank,	60 and 10	
No. 8 black ann't'd wire, per 100 lb.	\$3.45	
Com. wire nails, base per keg	\$2.30 to 2.55	
Cement c't'd nails, base per keg	2.30 to 2.55	

### Ferroalloys

Shipments remain in moderate volume, with little tendency to increase. The market is very quiet as to spot sales. No word has reached this district as to the course to be taken by producers in the matter of contracts for the coming year.

### Old Material

Local steel mills continue to take scrap at the increased schedule put into effect a week ago. In the meantime, heavy melting steel is moving in small lots at \$12.50 a gross ton, delivered. Other heavy tonnage grades are quiet, largely for the reason that the supply of heavy melting steel is rather free and producers do not need to turn to other grades to speed production.

Railroad offerings are heavy this week and, in view of the lack of demand by consuming interests, dealers are hopeful of being able to buy this scrap at prices below the level recently paid to the railroads. Several automobile body builders are offering larger tonnages of hydraulic sheets. The market for this grade is dull, and consumers have not taken more than 400 or 500 tons.

*Prices deliv'd Chicago district consumers:*  
*Per Gross Ton*

Basic Open-Hearth Grades:		
Heavy melting steel	\$12.50 to \$13.00	
Shoveling steel	12.50 to 13.00	
Frogs, switches and guards, cut apart, and misc. rails	13.00 to 13.50	
Hydraul. compressed sheets	10.25 to 10.75	
Drop forge flashings	8.60 to 9.00	
No. 1 busheling	9.50 to 10.00	
Forg'd cast and r'l'd steel carwheels	15.00 to 15.50	
Railroad tires, charg. box size	15.50 to 16.00	
Railroad leaf springs cut apart	15.50 to 16.00	

Acid Open-Hearth Grades:		
Steel couplers and knuckles	13.50 to 14.00	
Coil springs	16.00 to 16.50	

Electric Furnace Grades:		
Axle turnings	11.25 to 11.75	
Low phos. punchings	13.00 to 13.50	
Low phos. plates, 12 in. and under	13.00 to 13.50	

Blast Furnace Grades:		
Axle turnings	8.00 to 8.50	
Cast iron borings	6.75 to 7.25	
Short shoveling turnings	7.25 to 7.75	
Machine shop turnings	5.50 to 6.00	

Rolling Mill Grades:		
Iron rails	13.00 to 13.50	
Rerolling rails	14.50 to 15.00	

Cupola Grades:		
Steel rails, less than 3 ft.	14.00 to 14.50	
Steel rails, less than 2 ft.	14.75 to 15.25	
Angle bars, steel	13.50 to 14.00	
Cast iron carwheels	13.50 to 14.00	

Malleable Grades:		
Railroad	13.50 to 14.00	
Agricultural	12.50 to 12.75	

Miscellaneous:		
*Relaying rails, 56 to 60 lb.	23.00 to 25.00	
*Relaying rails, 65 lb. and heav.	26.00 to 31.00	

Per Net Ton		
Rolling Mill Grades:		
Iron angle and splice bars	12.00 to 12.50	
Iron arch bars and transoms	13.00 to 13.50	
Iron car axles	21.50 to 22.00	
Steel car axles	15.00 to 15.50	
No. 1 railroad wrought	9.75 to 10.25	
No. 2 railroad wrought	11.00 to 11.50	
No. 1 busheling	7.50 to 8.00	
No. 2 busheling	6.00 to 6.50	
Locomotive tires, smooth	14.50 to 15.00	
Pipes and flues	8.00 to 8.50	

Cupola Grades:		
No. 1 machinery cast	11.00 to 11.50	
No. 1 railroad cast	10.00 to 10.50	
No. 1 agricultural cast	9.50 to 10.00	
Stove plate	8.50 to 9.00	
Grate bars	8.50 to 9.00	
Brake shoes	8.50 to 9.00	

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

# CLEVELAND

## Steel Business Gaining, But at Very Slow Rate

**C**LEVELAND, Sept. 30.—Steel business continues to increase slightly in volume. Orders are mostly for small lots and from scattered sources. While not much interest is being shown in fourth quarter contracts, some contracts have been closed for bars, plates and shapes for the coming quarter at present prices and some consumers have secured extensions of third quarter contracts.

The market appears to have a firm tone on some products, but there is little evidence of a tendency to advance prices. The announcement of a few mills that they would advance auto body sheets to 3.60c. after Sept. 27 brought out some fourth quarter contracts. However, some of the larger consumers in the motor car field have made contracts only for October requirements, and several mills have not withdrawn the 3.50c. price.

Cleveland steel plants are operating at 50 per cent of ingot capacity, the same as a week ago. A slight increase in finishing mill operations in the northern Ohio territory is reported.

Demand for steel from the motor car industry shows no gain. Local forge shops and stamping plants are operating at recent rates. Production of motor cars in October is expected to be a little larger than in September. The Chevrolet Motor Co. has placed some forging steel for its new models, on which it is expected to get under way during the coming month. The local Fisher body plant that makes Chevrolet bodies has not yet got under production on the new design of bodies. The Ford Motor Co. is reported to have cut down on specifications for October shipment.

### Pig Iron

Furnaces continue to sell iron in moderate volume, but there are no orders for large lots. The market in this immediate territory is very quiet. Recent inquiries for foundry and malleable iron for first quarter delivery have resulted in several sales at present prices for delivery through the current quarter and into or through the first quarter. However, no sales have been made for the first quarter alone. Producers find some encouragement in shipments, which increased this month over those of August. One of the leading producers has shipped 25 per cent more iron during the current month than during the previous month. Gain in shipping orders is scattered, but little, if any, of it is due to increased activity on the part of motor car foundries.

While there has been no change in prices, the market has a weak tone, and the \$16.50 quotation on foundry and malleable iron that has appeared at competitive points is now being

quite commonly quoted for delivery to some points in northern Ohio and Indiana, and there are unconfirmed reports of shading to \$16. Local foundries quote \$17 for nearby shipment and \$17.50 for local delivery. The market in Michigan remains steady, with \$18 the ruling price.

Prices per gross ton at Cleveland:		
N'th'n fdy., sll.	1.75 to 2.25.	\$17.50
S'th'n fdy., sll.	1.75 to 2.25.	\$17.51 to 18.01
Malleable		17.50
Ohio silvery, 8 per cent		25.00
Basic Valley furnace		18.50
Stand. low phos., Valley		27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

### Bars, Plates and Shapes

Orders continue to gain a little from week to week. The improvement is more noticeable in the demand for structural material and plates than for bars. Some fourth quarter contracts have been placed for bars, plates and shapes at the current price of 1.60c., Pittsburgh, for the three products and 1.60c., Cleveland base, for steel bars for outside shipment and 1.65c. for local delivery. Some unfilled third quarter contracts carrying the recent prices have been extended into or through the fourth quarter. Orders for light plates for motor car frames made possible the starting up of a local plate mill during the week. A Lake shipyard has placed 680 tons of plates for tank tops for two Lake boats. The Biggs Boiler Works Co., Akron, was low bidder for a Detroit water pipe line requiring 500 tons of plates. The Pure Oil Co. tanks for Toledo, requiring 1650 tons, are reported to have been divided between two makers.

### Wire Products

Nails continue weak in some sections of Ohio, where prices as low as \$1.90 a keg are reported. Locally, the price is holding to \$2. Manufacturers' wire is firm at 2.30c.

### Sheets

Mills are getting quite a few small orders, mostly from outside of the motor car industry, and nearly all mills report a slight gain in business. Some have received orders from the Detroit territory that enabled them to increase operations this week. Manufacturers of steel furniture and partitions and other building material are operating at a fair rate, but business with most other consumers shows few signs of revival. Efforts to place black sheets on a 2.45c. Pittsburgh basis for the fourth quarter appear to have been successful, although some consumers have been able to have unfilled third quarter tonnage placed at 2.35c. carried over to the last quarter. Attempts to advance

auto body sheets to 3.60c. so far have been unsuccessful. While some mills withdrew the 3.50c. price Sept. 27, after closing fourth quarter contracts with their regular customers at that price, others are still naming 3.50c. One mill has marked up metal furniture sheets to 3.70c. However, this grade can still be bought at 3.60c. Galvanized sheets are still available at 3c.

### Strip Steel

Demand for both hot and cold-rolled strip continues to drag. Few consumers have placed fourth quarter contracts. The regular quotations of 1.65c. for wide strip and 1.75c. for narrow appear to apply mostly to miscellaneous customers, as consumers in the motor car fields are able to buy at \$1 a ton less. Cold-rolled strip is weak in that less-than-carload orders have been taken at 2.35c., Cleveland, which is the prevailing price for larger lots.

### Coke

Ohio by-product foundry coke has been reestablished at \$7.75, ovens, for October shipment. Foundry grades are still moving slow. A moderate amount of activity has developed in by-product coke for domestic use, which is unchanged at \$4.50, ovens.

### Old Material

Local mills continue to take scrap in limited quantities against contracts. There is no new consumer demand and not much activity among dealers. Transactions in steel-making and blast furnace grades are at quoted prices. Cast scrap is lower and negative. Some heavy melting steel scrap is being sold to Youngstown dealers at \$14.25, although two mills in that district are holding up shipments.

*Prices per gross ton delivered consumers' yards:*

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	\$11.75 to	\$12.25
No. 2 heavy melting steel	11.25 to	11.50
Compressed sheet steel	11.50 to	12.00
Light bundled sheet stampings	9.00 to	9.25
Drop forge flashings	10.00 to	10.50
Machine shop turnings	7.00 to	7.50
Short shoveling turnings	8.00 to	8.50
No. 1 railroad wrought	13.00 to	13.50
No. 2 railroad wrought	14.00 to	14.50
No. 1 busheling	11.75 to	12.00
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00

#### Acid Open-Hearth Grades:

Low phos., billet bloom and slab crops	17.50 to	18.00
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#### Blast Furnace Grades:

Cast iron borings	8.00 to	8.50
Mixed borings and short turnings	8.00 to	8.50
No. 2 busheling	7.50 to	8.00

#### Cupola Grades:

No. 1 cast	13.00 to	13.50
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.	18.50 to	19.50

#### Miscellaneous:

Rails for rolling	16.25 to	16.50
Railroad malleable	15.00 to	15.50

# NEW YORK

## Prices of Pig Iron Lower—Steel Improvement Small

**N**EW YORK, Sept. 30.—With the expansion of pig iron demand, and particularly the appearance of large individual inquiries, price competition has grown sharper. Buffalo foundry iron has been offered at \$15.50 base, furnace, a concession of 50c. a ton, while \$11.50, Birmingham, is a now rather common quotation on Alabama iron, with as low as \$11 reported named in some instances.

In northern New Jersey barge iron for shipment from Buffalo is reported to have been quoted at \$18.50, delivered. The rail rate from Jersey City is \$1.26 and the transfer, handling and storage charge is 40c., leaving a net of \$16.84, f.o.b. barge. Assuming the price at furnace is \$15.50, the allowance for barge transportation is \$1.34. On Southern iron the lowest combination rail and barge rate from Birmingham via Norfolk is understood to be \$4.85 a ton. On the basis of a quotation of \$11.50, Birmingham, this would make the price \$16.35 in New York harbor. To this must be added 20c. a ton for transfer to cars and the railroad freight rate to destination. However, this rail and water rate applies only to large shipments coming in ocean-going barges. Lots of as small as 200 tons each are handled by steamship from Savannah at a combination rate of \$5.50, which includes transfer to cars at New York dock.

Sales in this district, at 12,000 tons, compare with a total of 9000 tons in the previous week. The largest individual purchase was by the General Electric Co., which closed for 5000 tons.

*Prices per gross ton, delivered New York district:*

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$20.41 to \$20.91
•Buff. No. 2, del'd east. N. J.	18.78 to 19.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	18.89 to 19.39
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	18.89 to 19.89

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

\*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

### Warehouse Business

September business with most jobbers shows little or no improvement over that of August, the usual increase in buying after the summer season having failed to develop. Sheet prices continue to be subject to concessions, especially on galvanized sheets. Structural steel buying is limited to small lots, with users able to secure prompt delivery from the mills, even when small tonnages are required.

### Cast Iron Pipe

Operating rates of Northern foundries are slightly reduced from the 70 per cent average, which has been maintained for some months. Buying

by public utilities and municipalities is limited generally to carload lots of pipe, and the usual fall buying has not developed. With a number of municipalities preparing bond issues, however, producers expect some fair business to appear later in the fall. Quotations are maintained at \$36 to \$37 a net ton, f.o.b. Northern foundry, despite the lack of substantial buying.

*Prices per net ton deliv'd New York:*  
Water pipe, 6-in. and larger, \$38.90 to \$39.90; 4-in. and 5-in., \$41.90 to \$42.90; 3-in., \$48.90 to \$49.90. Class A and gas pipe, \$3 extra.

### Finished Steel

Signs of improvement in steel business are hard to find. While there have been gains in orders for some products, the change is not impressive. Efforts of steel mills to stiffen prices for the fourth quarter have at least given a good many buyers the impression that quotations are "on bottom," but interest in making fourth quarter commitments is not widespread because users of steel are still uncertain as to what their requirements may be through the entire quarter.

There is some doubt as to the success of the sheet manufacturers in trying to establish minimum prices of 2.45c. for black sheets, 2c. for No. 10 blue annealed and 2.15c. for No. 13 blue annealed. There have been very

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars, small shapes.....	3.10c.
Iron bars .....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.40c.
Flats and squares.....	3.90c.
Cold-roll. strip, soft and quarter hard .....	4.95c.
Hoops .....	3.75c.
Bands .....	3.40c.
Blue ann'd sheets (No. 10) .....	3.25c. to 3.40c.
Black sheets (No. 24*) .....	3.65c. to 3.90c.
Galvanized sheets (No. 24*) .....	4.25c.
Long terne sheets (No. 24) .....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, $\frac{1}{2} \times \frac{1}{2}$ in. and larger.....	3.40c.
Smooth finish, 1 to $2\frac{1}{2} \times \frac{1}{4}$ in. and larger .....	3.75c.
Open-hearth spring steel, bases,	
	4.50c. to 7.00c.

\*No 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent
Machine bolts, cut thread: Off List	
$\frac{3}{8} \times 6$ in. and smaller.....	65
1 x 30 in. and smaller.....	65
Carriage bolts, cut thread:	
$\frac{1}{2} \times 6$ in. and smaller.....	65
$\frac{3}{8} \times 20$ in. and smaller.....	65
Boiler Tubes: Per 100 Ft.	
Lap welded, 2-in.....	\$19.00
Seamless steel, 2-in.....	20.25
Charcoal iron, 2-in.....	26.25
Charcoal iron, 4-in.....	67.00

few tests of these prices. Reports from other districts intimate that black and blue annealed sheet prices are not as firm as some producers would like them to be. Galvanized sheets are being sold at 3c., Pittsburgh, to jobbers and large consumers. Only small buyers are paying higher than 3c.

Structural steel awards in the New York district are not particularly large. An inquiry for about 25,000 tons of fabricated steel for the third section of the West Side elevated highway is expected within two weeks.

### Reinforcing Bars

Owing to the placing of three large projects, total awards in this territory are unusually heavy, aggregating 7800 tons. Revised quotations of leading bar distributors, effective Oct. 1, are: For mill shipment, 1.70c. a lb., Pittsburgh, on building and paving work, and 1.80c. on subway work (rail steel to be offered at \$4 a ton less); for delivery from local stock, 2.35c. a lb., New York, up to 3.05c. a lb. for lots of less than two tons.

### Old Material

All grades of scrap lack strength, with consumers showing no interest in buying. No. 1 heavy melting steel is quoted by brokers filling contracts at \$12.50 a ton, delivered eastern Pennsylvania, and shipments are going to a consumer at Coatesville, Pa. A mill at Claymont, Del., which has had deliveries of heavy melting steel suspended for some months, is reported to have resumed shipments temporarily. Brokers buying for barge shipment of No. 1 steel to Buffalo users are obtaining most of the tonnage required at \$10 to \$10.25 a ton, on barge, New York, instead of \$10.50, the recent buying price.

*Dealers' buying prices per gross ton, f.o.b. New York:*

No. 1 heavy melting steel..	\$9.00 to \$10.25
Heavy melting steel (yard)	5.75 to 6.25
No. 1 hvy. breakable cast..	8.00 to 9.00
Stove plate (steel works)	6.00 to 6.25
Locomotive grate bars...	6.00 to 6.50
Machine shop turnings...	5.00 to 5.25
Short shoveling turnings..	5.00 to 5.50
Cast borings (blast fur. or steel works) .....	4.50 to 4.75
Mixed borings and turn- ings .....	4.50 to 5.00
Steel car axles.....	17.00
Iron car axles.....	19.00 to 19.50
Iron and steel pipe (1 in. dia., not under 2 ft. long)	7.50 to 8.00
Forge fire .....	7.00 to 7.50
No. 1 railroad wrought...	9.75
No. 1 yard wrought; long..	8.75
Rails for rolling.....	9.50 to 10.00
Stove plate (foundry)....	7.00
Malleable cast (railroad)...	10.50 to 11.00
Cast borings (chemical)...	8.50 to 9.00
<i>Prices per gross ton, deliv'd local foun- dries:</i>	
No. 1 machry. cast.....	\$14.00
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size.....	12.00
No. 2 cast (radiators, cast boilers, etc.) .....	11.50

# PHILADELPHIA

## Basic and Foundry Iron Lower— Steel Operations Unchanged

**P**HILADELPHIA, Sept. 30.—Business on steel mill books has not increased sufficiently to justify an increase in operating rates, which continue at about 50 per cent of capacity in the rolling departments, except for the leading independent, which is doing somewhat better. Steel consumers show more inclination to cover their requirements for a few weeks ahead and are not pressing for concessions as they did recently. While demand for pig iron is improved, the price of foundry grade lacks strength as a result of a further reduction in the price of Southern iron, and basic is off 50c. a ton.

Steel prices are still subject to small concessions on desirable business, despite efforts by mills to develop a firm market. Plate mills have some substantial tonnage in prospect, including four ships for the Grace Line, expected to be awarded in the next fortnight to the New York Shipbuilding Corporation. In the past week an oil company outside this district has closed on a total of 5000 tons of plates for delivery to the end of the year.

### Steel Bars

Prices of merchant steel bars continue at 1.60c. to 1.65c. a lb., Pittsburgh, or 1.89c. to 1.94c. per lb., delivered Philadelphia. The lower price applies on most orders of a carload or more. Reinforcing bars are 1.75c. to 1.85c., Pittsburgh, or 2.04c. to 2.14c., delivered Philadelphia, for billet steel bars, and rail steel bars range from 1.55c. to 1.65c., Franklin, Pa., or 1.84c. to 1.94c., delivered Philadelphia. Most of the current reinforced concrete projects require less than 100 tons of bars each, except for occasional work, such as four barracks for the United States Marine Corps at Quantico, Va., calling for 800 tons.

### Pig Iron

Quotations on eastern Pennsylvania foundry iron range from \$18 to \$18.50 a ton, furnace, with Southern iron offered at \$11.50 to \$12 a ton, Birmingham, or \$16.75 to \$17.25, on cars, Philadelphia, in small lots. Competition from Southern pig iron has again become a serious factor in eastern Pennsylvania, and furnace interests have applied to the Interstate Commerce Commission to have the present combination rail and water freight rates from Birmingham to Atlantic ports rescinded. Inquiry for pig iron is improving, many consumers apparently being satisfied that present prices are at a level offering advantages in forward buying. The Baldwin Locomotive Works is about to close on 2000 tons of floor and cylinder iron for first quarter delivery. Basic iron is more active. The Claymont, Del., consumer has bought about 3000 tons and will close on an additional 2000 to 3000 tons. The Standard Steel Works

Co. is inquiring for about 3000 tons of basic iron and a tonnage of low phosphorus. Recent quotations on basic show a market range of \$17.75 to \$18.25 a ton, delivered.

#### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil	\$18.76 to \$19.26
East. Pa. No. 2X, 2.25 to 2.75 sil	19.26 to 19.76
East. Pa. No. 1X	19.76 to 20.26
Basic (del'd east. Pa.)	17.75 to 18.25
Malleable	21.25
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'rg low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

### Shapes

Quotations on new business are generally 1.70c. a lb., f.o.b. nearest mill to consumer, or 1.76c., delivered Philadelphia. Much of the tonnage being entered on mill books, however, is at prices \$1 to \$2 a ton lower, as consumers are covering on protections, which have not been withdrawn. Fabricators are quoting on a number of new building projects, including a 400-ton garage at Pottsville, Pa., a 2500-ton building for the Girard Trust Co. in Philadelphia and two bridges for Philadelphia, requiring a total of 500 to 600 tons.

### Plates

Mills are generally quoting 1.70c. a lb., Coatesville, Pa., or 1.80 1/2c., delivered Philadelphia, except on large plate contracts, when concessions are usually granted. Operating rates of eastern Pennsylvania mills are generally unchanged at 50 per cent of capacity in their rolling departments, with slightly lower rates of ingot production. With some buying by oil companies, and a substantial tonnage in prospect for shipbuilding, mills are inclined to maintain a firm attitude in maintaining the present price level.

### Sheets

Sheet consumers in this district continue moderately active, and there

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, 1/4-in. and heavier	2.60c.
Structural shapes	2.60c.
Soft steel bars, small shapes, iron bars (except bands)	2.70c.
Reinfor. steel bars, sq., twisted and deform.	2.60c. to 2.70c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.25c.
Steel bands, No. 12 to 1/4-in. inclus.	3.00c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.70c.
†Galvanized sheets (No. 24)	4.25c.
Light plates, blue annealed (No. 10)	3.15c.
Blue ann'l'd sheets (No. 13)	3.30c.
Diam. pat. floor plates, 1/4-in.	5.30c.
Swedish iron bars	6.60c.
*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.	
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.	

For 50 bundles or more; 10 to 49  
bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49  
bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

is a slight improvement in the number of orders. One eastern Pennsylvania interest is operating its sheet mills at 75 to 80 per cent of capacity. The Claymont, Del., plate producer, which is installing a blue annealed mill, expects to roll its first sheets next week. Blue annealed sheets are quoted at 2.15c., Pittsburgh, or 2.44c., delivered Philadelphia, for No. 13 gage, and blue annealed plates are 2c., Pittsburgh, or 2.29c., delivered Philadelphia, for No. 10 gage. Black sheets are fairly firm at 2.45c., Pittsburgh, or 2.74c., Philadelphia, with a base price \$1 lower occasionally used in adding the extras for full finished sheets. Demand for galvanized sheets has been rather small recently, as most consumers are fairly well covered. With buying light, prices have rather generally settled to 3c., Pittsburgh, or 3.29c., Philadelphia, 3.05c., Pittsburgh, or 3.34c., Philadelphia, applying only on small lots.

### Imports

In the week ended Sept. 27 a total of 2651 tons of pig iron was received at this port from British India, 2000 tons of chrome ore from Portuguese Africa, 817 tons of scrap iron from Cuba and 21 tons of iron bars from Sweden.

### Old Material

Prices of all grades of scrap except No. 1 heavy melting steel are showing increasing unsteadiness in a quiet market. A consumer of heavy breakable cast at Florence, N. J., following a purchase at \$12.50 a ton, delivered, is offering \$12. Cast borings are off slightly, following sales at \$8.75 and \$8.50, delivered. No. 1 and No. 2 heavy melting steel are inactive as most eastern Pennsylvania consumers have a substantial tonnage still due on old contracts.

#### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$13.00
No. 2 heavy melting steel.	\$10.50 to 11.00
Heavy melting steel (yard)	10.00
No. 1 railroad wrought	14.75 to 15.00
Bundled sheets (for steel works)	9.50
Hydraulic compressed, new	11.00 to 11.50
Hydraulic compressed, old	9.50
Machine shop turnings (for steel works)	9.00
Heavy axle turnings (or equiv.)	11.50 to 12.00
Cast borings (for steel works and roll. mill)	8.50 to 8.75
Heavy breakable cast (for steel works)	11.50 to 12.00
Railroad grate bars	10.00
Stove plate (for steel works)	10.00
No. 1 low phos. hvy., 0.04% and under	20.00
Couplers and knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
No. 1 blast f'nace scrap	8.00 to 8.50
Wrot. iron and soft steel pipes and tubes (new specific.)	12.00 to 12.50
Shafting	18.00 to 18.50
Steel axles	20.50 to 21.00
No. 1 forge fire	11.00 to 11.50
Cast iron carwheels	15.00
No. 1 cast	13.00 to 13.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	13.50 to 14.00

## BIRMINGHAM

### Pig Iron Melters Still Buying Hand to Mouth—Steel Prices Lower

**B**IRMINGHAM, Sept. 30.—A limited number of the smaller melters have covered their fourth quarter pig iron requirements. The larger buyers have not covered, and the total tonnage under contract is but a small part of the probable make for the quarter. Several important melters carry as little as one or two cars of iron in stock, frequently requesting shipments within two days of order date. A decline in shipments during the past 10 days is attributed to a policy of some foundries, including pipe shops, to reduce inventories by Oct. 1. There is no evidence of any particular change in the melt and shipments are expected to take on more activity this week. Inquiries are scarce. District sales take the price of \$14, base Birmingham. Ten furnaces are active, the same as last week. Of this number, nine are on foundry iron and the other on basic iron. The Tennessee company, the largest producer of basic iron in the district, is operating only two furnaces and one of these is on foundry iron.

*Prices per gross ton, f.o.b. Birmingham dist. furnaces:*  
No. 2 fdy., 1.75 to 2.25 sil.....\$14.00  
No. 1 fdy., 2.25 to 2.75 sil.....14.50  
Basic .....14.00

#### Finished Steel

Inquiries for bars, plates, sheets and shapes show a gain. Sales held their own last week. Quotations on structural shapes and tank plates have been reduced \$1 a ton to 1.80c. to 1.85c. a lb. Quotations on black sheets are off \$1 a ton, new prices being 2.60c. to 2.65c., and galvanized are also \$1 a ton lower at 3.15c.

The Tennessee company is operating five of eight open-hearths at Fairfield and the Gulf States Steel Co. three of six at Alabama City, making a total of eight active furnaces of 23 in the district. All nine open-hearths at Ensley are idle.

Demand for fabricated structural steel is holding its own. The Virginia Bridge & Iron Co. is low bidder on several hundred tons for Kentucky State highway bridge work. The Southern Steel Works Co. has booked 200 tons for an addition to the Crane Co.'s foundry and pattern shop at Birmingham and 100 tons for the Singer Sewing Machine Co. at New Orleans.

#### Cast Iron Pipe

The market for pressure pipe is better in some sections than others, but on the whole the demand is holding up fairly well and bookings are averaging close to those of a year ago. Effects of the recent drought have brought out some new work, and a few buyers are beginning work on delayed construction programs in order to relieve unemployment. Government work in the Panama Canal Zone has resulted in the placing of some important pipe orders here.

Marrero, La., is in the market for

upward of 1500 tons, for which bids will be opened Oct. 30. A tonnage equally as large will be required for the project at Lebanon, Tenn., for which bids are to be taken in about 30 days. Columbia, Ky., is to open bids this week for several hundred tons, and Clarksville, Tenn., will open bids Sept. 30 on approximately 350 tons. Hazlehurst, Miss., will open bids Oct. 7 on 5256 ft. of 4-in. pipe, and Lamar, Mo., will open bids on the same date for 1545 ft. of 8-in. pipe. The American Cast Iron Pipe Co. and the National Cast Iron Pipe Co. have received contracts from Los Angeles for 637 tons and 363 tons respectively.

#### Coke

Shipments of foundry coke have been steady, but lighter than for any other September in years. Merchant producers are maintaining steady op-

erations as to the number of ovens, but owing to slow coking operations the output is lower than usual. There are 791 active ovens, leaving 420 on the idle list.

#### Old Material

The market was generally quiet last week, showing less activity than four weeks ago. This is due mainly to a lighter demand for steel scrap. Steel mills have light stocks for this season, and, with one exception, dealer stocks are scanty. Even so much as a normal demand would bring out a shortage in several lines.

*Prices per gross ton deliv'd Birmingham dist. consumers' yards:*

Heavy melting steel.....	\$12.00
Scrap steel rails.....	\$12.50 to 13.00
Short shoveling turnings.....	9.00
Cast iron borings.....	9.00
Stove plate .....	10.00
Steel axles .....	21.00
Iron axles .....	23.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	13.50
No. 1 cast.....	11.50
Tramcar wheels .....	11.50
Cast iron carwheels.....	12.00
Cast iron borings, chem....	13.50

## CINCINNATI

### Pig Iron Demand Gains Slightly—Improvement in Sheet Orders

**C**INCINNATI, Sept. 30.—Demand for pig iron improved last week. Furnace representatives report total sales of about 3400 tons, an increase of 800 tons over the preceding week. The outstanding order called for 1000 tons of Southern foundry iron, to be delivered in the next 90 days to a southern Ohio consumer. Two Cincinnati consumers have bought 200 tons and 150 tons of Northern iron, respectively, while a Dayton, Ohio, buyer took 150 tons and a northern Indiana melter closed for 200 tons.

*Prices per gross ton, deliv'd Cincinnati:*  
So. Ohio fdy., sil. 1.75 to 2.25 .....\$20.89 to \$21.39  
Ala. fdy., sil. 1.75 to 2.25..... 15.19 to 16.19  
Ala. fdy., sil. 2.25 to 2.75..... 15.69 to 16.69  
Tenn. fdy., sil. 1.75 to 2.25..... 15.19 to 16.19  
S'th'n Ohio silvery, 8 per cent ..... 24.39

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

#### Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
New billet reinforce. bars.....	3.15c.
Rail steel reinforce. bars.....	3.00c.
Hoops .....	3.90c.
Bands .....	3.35c.
Cold-fin. rounds and hex.....	3.80c.
Squares .....	4.30c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets .....	4.20c.
Small rivets .....	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c'td nails, base 100 lb. keg	2.95
Chain, per 100 lb.....	10.25

Net per 100 Ft.

Lap-welded steel boiler tubes, 2-in..	\$16.50
4-in. ....	34.50
Seamless steel boiler tubes, 2-in....	17.50
4-in. ....	36.00

#### Finished Steel

The uptrend in demand for sheets continues to feature the district market. The leading interest reports heavier bookings, continuing the up-swing which began about three weeks ago. Accordingly, production schedules are a trifle higher. In one unit the leading independent reports 100 per cent operation for this week as a result of the increase in bookings.

#### Old Material

While district mills are operating at slightly improved rates, they are not specifying or buying scrap. Shipments on most of the contracts have been suspended for indefinite periods, and virtually no new business is being closed. Dealers are bidding conservatively and are carefully watching the trend of the market.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

Heavy melting steel.....	\$11.00 to \$11.50
Scrap rails for melting.....	12.00 to 12.50
Loose sheet clippings.....	7.00 to 7.50
Bundled sheets .....	9.50 to 10.00
Cast iron borings.....	6.50 to 7.00
Machine shop turnings.....	6.00 to 6.50
No. 1 busheling.....	9.25 to 9.75
No. 2 busheling.....	6.00 to 6.50
Rails for rolling.....	13.00 to 13.50
No. 1 locomotive tires.....	13.25 to 13.75
No. 2 railroad wrought.....	11.00 to 11.50
Short rails .....	16.00 to 16.50
Cast iron carwheels.....	12.00 to 12.50
No. 1 machinery cast.....	14.50 to 15.00
No. 1 railroad cast.....	12.50 to 13.00
Burnt cast .....	7.00 to 7.50
Stove plate .....	7.00 to 7.50
Brake shoes .....	7.00 to 7.50
Agricultural malleable .....	12.50 to 13.00
Railroad malleable .....	13.50 to 14.00

August shipments of enameled sanitary ware totaled 200,231 pieces, compared with 207,600 pieces in July, according to reports received by the Department of Commerce.

# BOSTON

**Buffalo Pig Iron Breaks Below \$20 a Ton, Delivered—Some Scrap Prices Easier**

**B**OOSTON, Sept. 30.—Buffalo No. 2 plain and No. 2X irons have dropped below \$20 a ton, delivered in New England, one furnace having accepted and is offering those grades at \$15.50 a ton, on cars, Buffalo, which, with a \$4.28 a ton rail and water freight, brings the delivered price down to \$19.78 a ton. Other Buffalo furnaces have held to \$16 a ton, Buffalo, but furnaces east of Buffalo are meeting the \$15.50 Buffalo price, or slightly shading it, and are securing the bulk of current business. Alabama iron representatives also have reduced their price to \$11.50 a ton, furnace, but to date have not figured prominently in sales, the largest consumers of such iron having ample supplies for the remainder of 1930. Total sales the past week were slightly under 3500 tons. The Rhode Island Malleable Iron Co. is in the market for 1000 tons of malleable, and the Eastern Malleable Iron Co., Naugatuck, Conn., has yet to cover on its 2500-ton inquiry.

*Foundry iron prices per gross ton deliv'd to most New England points:*

†Buffalo, sil. 1.75 to 2.25...	\$19.78 to \$20.28
†Buffalo, sil. 2.25 to 2.75...	19.78 to 20.28
*Buffalo, sil. 1.75 to 2.25...	20.41 to 20.91
*Buffalo, sil. 2.25 to 2.75...	20.91 to 21.41
Va., sil. 1.75 to 2.25...	25.21
Va., sil. 2.25 to 2.75...	25.71
*Ala., sil. 1.75 to 2.25...	21.11
*Ala., sil. 2.25 to 2.75...	21.61
†Ala., sil. 1.75 to 2.25...	17.25
†Ala., sil. 2.25 to 2.75...	17.75

Freight rates: \$4.91 all rail and \$4.28 rail and water from Buffalo; \$5.21 all rail from Virginia; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

\*All rail rate.

†Rail and water rate.

## Reinforcing Steel

Business continues quiet, sales the past week not exceeding 500 tons. Prices are unchanged, as follows: Billet steel bars in one to five ton lots, 3.15c. a lb. from stock; six to 99-ton lots, 2.65c.; 100-ton lots and larger,

2.55c. Rail steel bars, 2.26½c. a lb., delivered common Boston freight rate points.

## Cast Iron Pipe

The only important tonnage sold the past week was 150 tons of 8-in. pipe to Fort Fairfield, Me., by the Donaldson Iron Co. All bids for 115 tons of 18-in. pipe and special fittings required by the Onset, Mass., fire district have been rejected. R. D. Wood & Co. were the low bidders on this tonnage. Quite a few car lots of pipe are moving from day to day, but anticipated large tonnages are slow in developing. Class B pipe is generally quoted at or close to \$36 a ton, on cars foundry, but in some instances \$37 is obtained. A \$3 differential is asked on Class A and gas pipe.

## Track Supplies

The Boston & Albany Railroad has placed 1900 tons of tie plates with Jones & Laughlin Steel Corp.

## Old Material

Heavy melting steel is 25c. to 50c. a ton lower than a week ago, and steel mill borings are off 40c., while in-

creased offerings of No. 1 machinery cast and a limited demand have forced prices off 50c. to \$1. Comparatively little scrap is being purchased for Pennsylvania delivery, and only limited tonnages of long bundled skeleton for the American Steel & Wire Co., Worcester, Mass. A Portland, Me., rolling mill is taking some axles, but otherwise business is virtually at a standstill. Stocks in dealers' yards are not increasing to any marked degree, as owners of scrap are selling at current prices only when necessity demands some ready cash.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

No. 1 heavy melting steel...	\$8.50 to 9.00
Scrap T rails.....	8.50 to 9.00
Scrap girder rails.....	7.50 to 8.25
No. 1 railroad wrought.....	8.00 to 8.50
Machine shop turnings.....	3.75 to 4.10
Cast iron borings (steel works and rolling mill).....	3.10 to 3.60
Bundled skeleton, long.....	6.10 to 6.60
Forge flashings.....	7.25 to 7.75
Blast furnace borings and turnings.....	3.10 to 3.50
Forge scrap.....	6.10 to 6.60
Shafting.....	13.00 to 14.00
Steel car axles.....	16.50 to 17.00
Wrought pipe, 1 in. in diameter (over 2 ft. long).....	7.00 to 7.25
Rails for rolling.....	10.00 to 10.25
Cast iron borings, chemical.....	9.00 to 9.50
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast.....	\$11.00 to \$11.50
No. 1 machinery cast.....	12.50 to 13.50
No. 2 machinery cast.....	10.50 to 11.50
Stove plate.....	8.00
Railroad malleable.....	14.00 to 14.50

# PACIFIC COAST

**Demand for Reinforcing Bars and Structural Steel Fairly Steady**

**S**AN FRANCISCO, Sept. 27.—(By Air Mail.)—Although both sales and inquiries were not especially large this week, a somewhat better undertone is noted, and prices are being well maintained. The outstanding award was 470 tons of H columns for the Honolulu Oil Company, San Francisco, placed with the Pacific Coast Steel Corp.

## Bars

Demand for reinforcing steel bars is well sustained and awards this week exceeded 1000 tons. Unnamed interests took 200 tons for a hospital in San Bernardino, 100 tons for a school auditorium in Long Beach and 300 tons for a theater on South Broadway, Los Angeles. Pending business aggregates upward of 7000 tons. New inquiries include 400 tons for the Mills Building, San Francisco, and 400 tons for the Edmond Meany Hotel in Seattle. Out-of-stock prices both in the Los Angeles and San Francisco districts continue firm at 2.50c., base, on carload lots.

## Plates

The Chicago Bridge & Iron Works secured an elevated steel tank and tower for Procter & Gamble Co. at Long Beach, requiring 50 tons. No definite date for bids has been set for the 10,000-ton Seattle pipe line project. Quotations continue to range be-

*Pig iron prices per gross ton at San Francisco:*

*Utah basic.....	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25.....	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25.....	22.00 to 24.00

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

tween 2.15c. and 2.25c., c.i.f. coast ports.

## Shapes

Several new projects involving fair-sized lots of structural shapes are up for figures. Among these are 2400 tons for the new Mills Building, San Francisco, bids on which will be opened Oct. 9. Awards included 125 tons for a school auditorium in Long Beach, booked by the Pacific Iron & Steel Co., 270 tons for an apartment house on Vallejo Street, San Francisco, secured by McClintic-Marshall Co., and 176 tons for a rock crushing plant at Livermore, Cal., awarded to the Western Iron Works. Plain ma-

## Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.40c.
Black sheets (No. 24).....	4.35c.
Blue ann'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.00c.
Struc. rivets, ¼-in. and larger.....	5.00c.
Com. wire nails, base per kg.....	\$3.35
Cement c't'd nails, 100 lb. keg.....	3.35

terial remains unchanged at 2.15c. to 2.25c., e.i.f.

#### Cast Iron Pipe

The only pipe award in excess of 100 tons went to the Central Foundry Co. and called for 150 tons of Universal pipe for Spokane, Wash. C. G. Claussen & Co. were low bidders on 2022 tons of 4 to 8-in. Classes B, 150

and 250 pipe for the East Bay Municipal Utility District, Oakland, Cal. Bids were opened on 2216 tons of 4 to 12-in. Class B pipe for Long Beach and on 3008 tons of 16 to 24-in. Classes B and 150 pipe for Los Angeles. The only new inquiry of importance involves 331 tons of 6 to 12-in. Class 150 pipe for Fullerton, Cal., bids on which will be opened Oct. 7.

### ST. LOUIS Pig Iron Buyers Waiting—Railroads Issue Steel Inquiries

**S**T. LOUIS, Sept. 30.—The end of the third quarter finds more interest in the pig iron market than was shown three months ago, and yet buying continues light. The fact is that melters are still hesitant about commitments for the remainder of the year, and are waiting to see what the early weeks of October will bring in new business and pig iron prices. Makers expect very little buying until about Oct. 15. Great interest is being shown here in the basic situation, as the large consumers on the East Side are beginning to make up their minds as to their fourth quarter purchases. Prices are unchanged. The farm implement and stove trades have suffered from reduced purchasing power, resulting from the drought, and business is disappointing.

*Prices per gross ton at St. Louis:*

No. 2 fdy., sil. 1.75 to 2.25,	\$17.50
f.o.b. Granite City, Ill.	
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd.	\$15.92 to 16.42
Northern malleable, deliv'd	19.16 to 19.66
Northern basic, deliv'd.	19.16 to 19.66

Freight rates: 75c, (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

#### Finished Steel

Railroads centering in St. Louis have issued inquiries for fourth quarter requirements of plates, shapes and sheets, and mills are hopeful of some business resulting therefrom, especially as specifications against third

#### Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
Per Cent Off List	
Tank rivets, $\frac{1}{2}$ -in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

quarter contracts amounted to almost nothing. Warehouse business shows moderate betterment. Advance ordering of wire fencing and accessories is reported to be the smallest in recent years as a result of the effects of the drought on farm purchasing power. Structural fabricators report a fairly large volume of small orders, although large tonnages are scarce. A leading fabricator is now booked up to capacity for the remainder of the year. The only reinforcing bar award of the week, 500 tons for a St. Louis sewer, went to the Missouri Rolling Mills Corp.

#### Old Material

Activity in the scrap market the past week was confined to purchases by dealers to cover sales of melting steel and specialties made the preceding week. There is said to be very little distress material and not much coming from the country yards, with the result that railroad offerings

have been keenly sought at good prices. There was not much buying by consumers during the week. Rolling mill grades are dull. Rails and specialties are scarce. Prices are unchanged.

The St. Louis-San Francisco offers 150 carloads, the largest offering in the history of the road, according to dealers. Other lists follow: Pennsylvania, 33,955 tons; Cleveland, Cincinnati, Chicago & St. Louis, 1206 tons; Missouri-Kansas-Texas, 420 tons; International Great Northern, 400 tons; Chicago, Milwaukee, St. Paul & Pacific, 150 carloads; Missouri Pacific, 115 carloads; New York, Chicago & St. Louis, 61 carloads; Belt Railway of Chicago, 14 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:	
Selected heavy melting steel	\$11.50 to \$12.00
No. 1 heavy melting or shoveling steel	11.50
No. 2 heavy melting or shoveling steel	10.25 to 10.50
No. 1 locomotive tires	13.25 to 13.75
Misc. stand-sec. rails including frogs, switches and guards, cut apart	13.00 to 13.50
Railroad springs	14.50 to 15.00
Bundled sheets	7.00 to 7.50
No. 2 railroad wrought	11.00 to 11.50
No. 1 busheling	8.00 to 8.50
Cast iron borings and shoveling turnings	6.00 to 6.50
Iron rails	10.00 to 11.00
Rails for rolling	13.50 to 14.00
Machine shop turnings	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Steel car axles	16.50 to 17.00
Iron car axles	21.00 to 21.50
Wrot. iron bars and trans.	14.00 to 14.50
No. 1 railroad wrought	9.00 to 9.50
Steel rails, less than 3 ft.	14.50 to 15.00
Steel angle bars	12.50 to 13.00
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	11.00 to 11.50
Railroad malleable	11.50 to 12.00
No. 1 railroad cast	11.00 to 11.50
Stove plate	9.00 to 9.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00
Agricul. malleable	10.00 to 10.50

### CANADA

#### Pig Iron Business Improving Slightly—Structural Inquiries Appearing

**TORONTO**, Sept. 30.—While there is no last-minute rush to cover pig iron needs for last quarter, business is showing improvement, and a number of meltters have covered. Inquiries and specifications continue to appear which indicate that other consumers will place forward delivery contracts. Spot buying is also picking up. While most of the sales run to one or two car lots, sales were made for as much as 200 tons. The weekly total of new business is gradually increasing, according to local blast furnace representatives, who point out, however, that the average is about 50 per cent under that of a year ago. Local steel interests look for improvement in the industry as a result of the recent advance in tariff. Pig iron prices are unchanged.

	Delivered Toronto
No. 1 fdy., sil. 2.25 to 2.75	\$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
	Delivered Montreal
No. 1 fdy., sil. 2.25 to 2.75	\$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50

#### Rails

The Algoma Steel Corporation, Sault Ste. Marie, Ont., will resume operations at its rail mill on Oct. 10 or 15, according to a statement made by W. C. Franz, president. The company has closed a rail contract of sufficient tonnage to maintain mill operation on single shift until December, after which the mill will be shut down again for a time to permit of necessary work in connection with the installation of the new machinery.

#### Structural Steel

Inquiries that are appearing indicate some good tonnage contracts for early closing, both in the Toronto and Montreal districts. Business of the past few days was confined to lots under 500 tons and was spread over Ontario and Quebec.

#### Old Material

Dull trading characterized business in this market for the week, chiefly because of the Jewish holiday season.

Sales made were mostly in small lots, although some forward delivery contracts were included. Mills continue to take delivery of heavy melting steel and turnings in small tonnages. Dealers look for early betterment in the market. Prices are unchanged.

*Dealers' buying prices for old material:*

Per Gross Ton	Toronto Montreal
Heavy melting steel.....	\$8.00
Rails, scrap.....	8.00
No. 1 wrought.....	9.00
Machine shop turnings.....	6.00
Boiler plate.....	7.00
Heavy axle turnings.....	7.00
Cast borings.....	6.50
Steel borings.....	6.50
Wrought pipe.....	4.00
Steel axles.....	10.00
Axles, wrought iron.....	12.00
No. 1 machinery cast.....	12.00
Stove plate.....	10.00
Standard carwheels.....	10.50
Malleable.....	10.00
Per Net Ton	
No. 1 mach'ry cast.....	11.00
Stove plate.....	9.00
Standard carwheels.....	10.00
Malleable scrap.....	9.00

## Youngstown

### Youngstown Valley Mill Operations Erratic

YOUNGSTOWN, Sept. 30.—The Falcon plant at Niles of the Empire Steel Corp. resumed operations this week, with 13 mills running. The Republic Steel Corp. states it is able to maintain average schedules at 65 per cent, while Newton Steel Co. is operating its Newton Falls works in Ohio at 50 per cent on releases from the automobile industry.

Newton has omitted its third quarter cash dividend on common stock, however, heretofore paid this year at the rate of 50c. a share quarterly. The company will pay on Oct. 31 the usual quarterly dividend of \$1.50 a share on its preferred stock to holders of record Oct. 15.

Officials say that negotiations are being continued for a merger with the Corrigan-McKinney Steel Co., Cleveland.

This week the Sharon Steel Hoop Co. blows out its blast furnace at Lowellville, Mahoning County, for relining and repairs. The stack will resume immediately upon the completion of this work. Sharon Steel also suspends its sheet mills for the week. The company has passed its third quarter dividend on common stock.

The Sheet & Tube company reduces production schedules to a 50 per cent basis for the week.

Of 51 independent open-hearth furnaces, 25 are operating, with Bessemer steel capacity active at 50 per cent. Much of the current Bessemer output is being absorbed in pipe making.

Philadelphia sales office of Cutler-Hammer, Inc., is now situated in the new Terminal Commerce Building, 401 North Broad Street. The new quarters include warehouse facilities. F. J. Burd is manager.

## BUFFALO

### Pig Iron Sales 6000 Tons or More—Steel Operations Unchanged

BUFFALO, Sept. 30.—Aggregate sales of pig iron in the past week are estimated at 6000 to 7000 tons. Not so much inquiry is coming out. An Eastern user is asking for 1000 tons of malleable. Canal shipments show no decrease. Prices in the district remain firm at \$18.50, base. Furnace operation is unchanged.

*Prices per gross ton, f.o.b. furnace:*

No. 2 fdy., sil. 1.75 to 2.25.....	\$18.50
No. 2X fdy., sil. 2.25 to 2.75.....	19.00
No. 1 fdy., sil. 2.75 to 3.25.....	20.00
Malleable, sil. up to 2.25.....	19.00
Basic.....	17.50
Lake Superior charcoal.....	27.28

### Finished Steel

Operations of Buffalo mills are about the same as a week ago. The Lackawanna plant of the Bethlehem Steel Co. is operating 13 open-hearths; the Donner plant of the Republic Steel Corp. is operating four; Wickwire-Spencer, three; and the Gould Coupler Co., one. The Seneca Iron & Steel Co. continues to operate at 45 to 50 per cent. A Buffalo fabricator took 100 tons of structural steel for a local factory building and another took 600 tons of structural steel for the Central Union School at Niagara Falls, N. Y. Another structural commitment was 200 tons for an assembly building in connection with a shrine at Auriesville, N. Y.

### Old Material

Reports of a sale of 7000 tons of No. 1 heavy melting steel to a Buffalo user are denied. The reported price was \$13.75. New business is slack. Although it is understood that the largest consumer in the district will pay \$12.50 for No. 1 heavy melting steel, no dealer is anxious to take advantage of this offer. With one of the principal consumers of No. 1 machinery cast and stove plate working only three days a week, the demand for these grades is slow. A small ton-

### Warehouse Prices, f.o.b. Buffalo

Base per Lb.

Plates and struc. shapes.....	3.25c.
Soft steel bars.....	3.15c.
Reinforcing bars.....	2.95c.
Cold-fin. flats and sq.....	3.65c.
Rounds and hex.....	3.15c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.60c.
Bands.....	3.50c.
Hoops.....	3.90c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$2.60
Black wire, base per 100 lb.....	3.20

nage of No. 1 machinery cast is reported to have been sold at \$11.25 and a very small lot of stove plate at \$10.25 to \$10.50.

*Prices per gross ton, f.o.b. Buffalo consumers' plants:*

#### Basic Open-Hearth Grades:

No. 1 heavy melting steel.....	\$12.75 to \$13.25
No. 2 heavy melting scrap.....	11.00 to 12.00
Scrap rails.....	12.00 to 12.50
Hydraulic comp. sheets.....	11.25 to 12.25
Hand bundled sheets.....	9.00 to 9.50
Drop forge flashings.....	11.00 to 11.50
No. 1 busheling.....	11.25 to 12.50
Hvy. steel axle turnings.....	11.00 to 11.50
Machine shop turnings.....	6.00 to 7.00
No. 1 railroad wrought.....	10.00 to 10.50

#### Acid Open-Hearth Grades:

Knuckles and couplers.....	15.00 to 15.50
Coil and leaf springs.....	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
Low phos. billet and bloom ends.....	16.50 to 17.00

#### Electric Furnace Grades:

Short shov. steel turnings.....	9.75 to 10.25
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#### Blast Furnace Grades:

Short mixed borings and turnings.....	7.50 to 8.00
No. 2 busheling.....	7.00

#### Rolling Mill Grades:

Steel car axles.....	16.00 to 16.50
Iron axles.....	19.00 to 19.50

#### Cupola Grades:

No. 1 machinery cast.....	11.00 to 12.00
Stove plate.....	10.25 to 10.50
Locomotive grate bars.....	8.25 to 9.25
Steel rails, 3 ft. and under.....	16.00 to 16.50
Cast iron carwheels.....	13.50 to 14.00

#### Malleable Grades:

Industrial.....	14.25 to 15.25
Railroad.....	14.25 to 15.25

#### Agricultural.....

14.25 to 15.25
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#### Special Grades:

Chemical borings.....	11.50 to 12.00
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tons of coal annually and has 1100 beehive coke ovens.

Officers of the united firm are: Fred J. Waldo, president; Justus Egbert, vice-president and treasurer; George A. Maltby, vice-president; Charles S. B. Ward, vice-president; Elmer E. Finck, secretary; Michael F. Selbert, assistant secretary; Arthur J. McCarthy, assistant treasurer. The first four named, together with John H. Bradley and Ward A. Wickwire of Buffalo, constitute the board of directors. Mr. Ward is president of the Pleasant Valley Mining Co. and also is president of the American Wholesale Coal Association.

Plans for a new steel warehouse to be constructed at Hammond, Ind., have been announced by the W. G. Holliday Co., Indianapolis.

# ▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲

## Mill Prices of Semi-Finished Steel

### Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$31.00
Rerolling, 4-in. and under 10-in., Youngstown	31.00
Rerolling, 4-in. and under 10-in., Cleveland	31.00
Rerolling, 4-in. and under 10-in., Chicago	32.00
Forging quality, Pittsburgh	36.00

### Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

### Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

### Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	\$31.00
Youngstown	31.00
Cleveland	31.00

### Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$36.00
Cleveland	36.00
Chicago	37.00

## Prices of Raw Material

### Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit

Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	Sc. to 9c.
Iron ore, low phos., Swedish, average 68%	11c.
iron	11c.
Iron ore, basic Swedish, average 65%	9c.
iron	9c.
Manganese ore, washed 52% manganese, from the Caucasus	.26c. to .28c.
Manganese ore, Brazilian, African or Indian, basic 50%	.26c. to .28c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$14.00

Per Gross Ton

Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Per Lb.	.....

Molybdenum ore, 85% concentrates of MoS<sub>2</sub> delivered

50c. to 55c.

### Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt	\$2.60 to \$2.65
Foundry, f.o.b. Connellsville prompt	3.25 to 4.75
Foundry, by-products, Ch'go ovens	8.00
Foundry, by-products, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

### Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.35
Mine run coking coal, f.o.b. W. Pa. mines	1.40 to 1.50
Gas coal, 3/4-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	.55 to .65
Gas slack, f.o.b. W. Pa. mines	.90 to 1.00

### Ferromanganese

Per Gross Ton

Domestic, 80%, seaboard	\$94.00 to \$99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

### Spirgeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$31.00 to \$33.00
Domestic, 16 to 19%	29.00 to 32.00

### Electric Ferrosilicon

Per Gross Ton Delivered

50%	\$83.50
75%	130.00

Per Gross Ton Furnace

10%	\$35.00
12%	37.00
14%	39.00

Per Gross Ton Furnace

10%	\$26.50
12%	32.50
14%	34.50

### Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton	Per Gross Ton
6%	\$21.00
7%	21.50
8%	22.00
9%	22.50
10%	23.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

### Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd

65 to 70% Cr., per lb. contained Cr.

delivered, in carloads

..... \$1.30 to \$1.40

Ferrochromium, 4 to 6% carbon and up,

65 to 70% Cr., per lb. contained Cr.

delivered, in carloads

..... 11.00c.

Ferrovanadium, per lb. contained vanadium, f.o.b. furnace

..... \$3.15 to \$3.65

Ferrocobaltitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads

..... \$160.00

Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton

..... \$91.00

Ferrophosphorus, electric 24%, f.o.b. An-

niston, Ala., per gross ton

..... \$122.50

### Fluxes and Refractories

#### Fluorspar

Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	\$17.00 to \$17.50
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#### Fire Clay Brick

Per 1000 f.o.b. Works

High-Heat Intermediate

Duty Brick Heavy Duty Brick

Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00

Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00

Ground fire clay, per ton	7.00
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#### Silica Brick

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

### Soft Steel

	<i>Base per Lb.</i>
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.94c.
Del'd New York	1.98c.
F.o.b. Cleveland	1.60c. to 1.65c.
F.o.b. Lackawanna	1.70c. to 1.75c.
F.o.b. Birmingham	1.85c.
C.i.f. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

### Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.70c. to 1.75c.
F.o.b. Birmingham, mill lengths	1.85c.

### Rail Steel

F.o.b. mills, east of Chicago dist.	1.60c.
F.o.b. Chicago Heights mill	1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

### Iron

Common iron, f.o.b. Chicago	1.70c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

## Tank Plates

	<i>Base per Lb.</i>
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c. to 1.75c.
F.o.b. Birmingham	1.80c. to 1.85c.
Del'd Cleveland	1.781/2c.
F.o.b. Philadelphia	1.8001/2c. to 1.851/2c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
F.o.b. Lackawanna	1.70c.
Del'd New York	1.88c.
C.i.f. Pacific ports	2.15c. to 2.25c.

## Structural Shapes

	<i>Base per Lb.</i>
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c. to 1.75c.
F.o.b. Birmingham	1.80c. to 1.85c.
Del'd Cleveland	1.781/2c.
F.o.b. Philadelphia	1.8001/2c. to 1.851/2c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.781/2c.
Del'd Philadelphia	1.71c. to 1.76c.
Del'd New York	1.851/4c.
C.i.f. Pacific ports	2.15c. to 2.25c.

## Hot-Rolled Hoops, Bands and Strips

	<i>Base per Lb.</i>
6 in. and narrower, P'gh	1.75c.
Wider than 6 in., P'gh	1.65c.
6 in. and narrower, Chicago	1.85c.
Wider than 6 in., Chicago	1.75c.
Cooperage stock, P'gh	1.90c. to 2.00c.
Cooperage stock, Chicago	2.00c. to 2.10c.

## Cold-Finished Steel

	<i>Base per Lb.</i>
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	2.45c. to 3.40c.
Strips, P'gh	2.35c. to 2.45c.
Strips, Cleveland	2.35c. to 2.45c.
Strips, del'd Chicago	2.68c. to 2.73c.
Strips, Worcester	2.60c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.60c.

\*According to size.

## Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

### To Merchant Trade

	<i>Base per Keg</i>
Standard wire nails	\$2.00 to \$2.10
Cement coated nails	2.00 to 2.10
Galvanized nails	4.00 to 4.10

	<i>Base per Lb.</i>
Polished staples	2.60c. to 2.70c.
Galvanized staples	2.85c. to 2.95c.
Barbed wire, galvanized	2.80c. to 2.90c.
Annealed fence wire	2.15c. to 2.25c.
Galvanized wire, No. 9	2.60c. to 2.70c.
Woven wire fence (per net ton to retailers)	\$65.00

### To Manufacturing Trade

	<i>Base per Lb.</i>
Bright hard wire, Nos. 6 to 9 gage	2.30c.
Spring wire	3.30c.

(Carload lots, f.o.b. Chicago)

Wire nails

Annealed fence wire

Bright hard wire to manufacturing trade

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

## Light Plates

### Base per Lb.

No. 10, blue annealed, f.o.b. P'gh	1.90c. to 2.00c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.10c.
No. 10, blue annealed, del'd Phila.	2.32c. to 2.42c.
No. 10, blue annealed, B'ham	2.15c.

## Sheets

### Blue Annealed

### Base per Lb.

No. 18, f.o.b. P'gh	2.05c. to 2.15c.
No. 18, f.o.b. Chicago dist.	2.25c.
No. 18, del'd Philadelphia	2.44c.
No. 18, blue annealed, B'ham	2.30c.

### Box Annealed, One Pass Cold Rolled

### Base per Lb.

No. 24, f.o.b. Pittsburgh	2.45c.
No. 24, f.o.b. Chicago dist. mill	2.55c.
No. 24, f.o.b. Birmingham	2.60c. to 2.65c.

## Steel Furniture Sheets

### Base per Lb.

No. 24, f.o.b. P'gh	3.60c. to 3.70c.
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## Galvanized

### Base per Lb.

No. 24, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 24, f.o.b. Chicago dist. mill	3.10c. to 3.20c.
No. 24, del'd Cleveland	3.181/2c. to 3.281/2c.
No. 24, del'd Philadelphia	3.29c. to 3.39c.
No. 24, f.o.b. Birmingham	3.15c. to 3.20c.

## Tin Mill Black Plate

### Base per Lb.

No. 28, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 28, f.o.b. Chicago dist. mill	2.80c. to 2.90c.

## Automobile Body Sheets

### Base per Lb.

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Pittsburgh	3.50c.

## Tin Plate

### Per Base Box

Standard cokes, f.o.b. P'gh district mills	\$8.25
Standard cokes, f.o.b. Gary	5.35

## Terne Plate

### (F.o.b. Morgantown or Pittsburgh)

### (Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.30	25-lb. coating I.C. \$15.20
15-lb. coating I.C. 12.90	30-lb. coating I.C. 16.00
20-lb. coating I.C. 14.00	40-lb. coating I.C. 17.80

## Alloy Steel Bars

### (F.o.b. maker's mill)

### Alloy Quantity Bar Base

### 2.65c. per Lb.

S.A.E. Series Numbers	Differential
2000 (1/4% Nickel)	\$0.25
2100 (1/4% Nickel)	0.55
2300 (3/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum 1.25 to 1.75 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20</td

## Fabricated Structural Steel

### New Projects of 24,000 Tons Include 5000-Ton Viaduct— Awards Only 15,000 Tons

NEW projects requiring fabricated steel reached a total of only about 24,000 tons this week, compared with 37,000 tons a week ago. Included were two apartment buildings in New York, one of 1500 tons on Hudson Street, another of 2000 tons on East Fifty-eighth Street, a 2500-ton building in Philadelphia for the Girard Trust Co., 5000 tons for the Western Hill viaduct in Cincinnati and 1760 tons for highway bridges at Carrollville, Wis.

The total of awards was one of the smallest of the year, at slightly in excess of 15,000 tons. The only awards of size were 2700 tons for the Steinmetz School in Chicago, 1000 tons for a hospital building in Brooklyn, 1000 tons for a Y. M. C. A. building on West Twenty-second Street, New York, and 1100 tons for a medical school at Columbia University, New York. Awards follow:

#### North Atlantic States

HARTFORD, CONN., 300 tons, two airplane hangars, for United Airports, to Levering & Garrigues Co.  
CAMBRIDGE, MASS., 275 tons, Harvard freshman dormitory, to New England Structural Co.  
BOSTON & MAINE RAILROAD, 100 tons, signal bridges, to Boston Bridge Works, Inc.  
NEW YORK, 517 tons, addition to Hudson Street station of New York Edison Co., to Levering & Garrigues Co.  
NEW YORK, 1000 tons, Y. M. C. A. building on West Twenty-second Street, to Post & McCord.  
NEW YORK, 1100 tons, medical school for Columbia University, to Hadden Iron Construction Co.  
BROOKLYN, 1000 tons, hospital building, to George A. Just.  
BUFFALO, 100 tons, new factory for W. A. Case & Son Mfg. Co., to Kellogg Structural Steel Co.  
ATRIEVILLE, N. Y., 200 tons, assembly building for a Roman Catholic shrine, to McClintic-Marshall Co.  
NIAGARA FALLS, N. Y., 600 tons, Central Union School, to Buffalo Structural Steel Co.  
PHILADELPHIA, 500 tons, building for Wheeling Corrugating Co., reported to Belmont Iron Works.  
BALTIMORE, 135 tons, Baltimore & Ohio freight house, to Dietrich Brothers.

#### The South

BIRMINGHAM, 200 tons, foundry and pattern shop addition for Crane Co., to Southern Steel Works.  
NEW ORLEANS, 100 tons, Singer Sewing Machine Co. office building, to Southern Steel Works.

#### Central States

CLEVELAND, 575 tons, Cleveland Clinic, to McClintic-Marshall Co.  
CINCINNATI, 475 tons, Frayrs building, to Schriver Co.  
MILWAUKEE, 330 tons, Home Savings Bank, to Worden-Allen Co.  
CHICAGO, 900 tons, Rapid Transit Co. platforms, to Hansell-Elcock Co.  
CHICAGO, 2700 tons, Steinmetz School, to Midland Structural Steel Co.  
CHICAGO, 125 tons, balconies for Fine Arts building, to Hansell-Elcock Co.  
STATE OF MINNESOTA, 630 tons, highway bridges; 400 tons, to Minneapolis-Moline Power Implement Co., 230 tons to American Bridge Co.  
STATE OF SOUTH DAKOTA, 285 tons, highway bridges, to Minneapolis-Moline Power Implement Co.

#### Western States

LONG BEACH, CAL., 125 tons, school auditorium, to Pacific Iron & Steel Co.

TOLEDO, 700 tons, United States Court House.

LA CROSSE, WIS., 325 tons, State highway bridge in Trempealeau County; bids close Oct. 10.

CARROLLVILLE, WIS., 400 tons for Newport Chemical Co.

STATE OF MISSOURI, 1760 tons, highway bridges.

#### Western States

LOS ANGELES, 560 tons, bridge over Los Angeles River; Oberg Brothers, general contractors.

PHOENIX, ARIZ., 300 tons, bridge on Flagstaff Highway; bids Oct. 15.

SAN FRANCISCO, 2400 tons, Mills building; bids Oct. 9.

#### Canada

CHATHAM, ONT., 200 tons, municipal bridge over River Thames; A. L. Thompson, city manager.

TORONTO, 300 tons, municipal bridge over Humber River; Bert S. Wemp, chairman of Board of Control.

LOS ANGELES, 200 tons, steel joists for several buildings, to Soule Steel Co.

SAN FRANCISCO, 470 tons, H-columns for Honolulu Oil Co., to Pacific Coast Steel Corp.

SAN FRANCISCO, 270 tons, apartment building on Vallejo Street, to McClintic-Marshall Co.

LIVERMORE, CAL., 176 tons, rock crushing plant, to Western Iron Works.

#### Canada

MOOSE RIVER, ONT., 2000 tons, bridge over Moose River for Temiskaming & Northern Ontario Railway, to Hamilton Bridge Co.

#### STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

SOUTHBRIDGE, MASS., 100 tons, hospital.

WORCESTER, MASS., 170 tons, State normal school.

BOSTON, 255 tons, South Boston bath house.

FITCHBURG, MASS., 700 tons, plant for Simonds Saw & Steel Co.

NEW YORK, 1500 tons apartment building on Hudson Street.

NEW YORK, 1000 tons, apartment building on Christopher Street. Former bids rejected; new bids being taken.

NEW YORK CENTRAL RAILROAD, 200 tons, Grade crossing elimination.

NEW YORK, 2000 tons, apartment building on East Fifty-eighth Street.

PLATTSBURG, N. Y., 650 tons, normal school building.

PHILADELPHIA, 550 tons; bridge at Mascher Street over Reading Railroad, 300 tons, and bridge at Rising Sun Avenue and Bristol Street over Philadelphia, Newtown & New York Railroad, 250 tons.

PHILADELPHIA, 2500 tons, Girard Trust Co. building.

STATE OF PENNSYLVANIA, 700 tons, bridge in Lycoming County; T. J. Foley, Pittsburgh, low bidder for general contract.

POTTSVILLE, PA., 400 tons, garage.

OLY CITY, PA., 1000 tons, foundry for National Transit Pump & Machine Co.

PITTSBURGH, 760 tons, Ardmore Boulevard bridge; Herkner Co., Cleveland, low bidder on general contract.

NEW CASTLE, PA., 200 tons, State highway bridge; Whitaker & Diehl, general contractors.

#### The South

LATONIA, KY., 200 tons, building for Standard Oil Co.

#### Central States

CINCINNATI, 5000 tons, Western Hill viaduct; bids on general contract to be opened Oct. 22.

## Railroad Equipment

Milwaukee Road will build 10 mail-express cars in its own shops.

Burlington will build 10 baggage cars in its own shops.

Erie Railroad has ordered two mail-baggage cars from Bethlehem Steel Co., instead of American Car & Foundry Co., as recently reported.

Baltimore & Ohio is in the market for 25 Santa Fe and 25 mountain type locomotives.

## New Publication on Far Eastern Mining

The Mineral Industry of the Far East, by Boris P. Torgasheff, has been published in Shanghai, China, by the Chali Co., 6 Kiukiang Road. The volume, consisting of 516 pages, 320 statistical tables and 14 maps, outlines and gives detailed information on the mining industries in China, Manchuria, Japan, Chosen, Formosa, Indo-China, Philippine Islands and eastern Russia. Most of the information included in this work was obtained by the author through direct contact with the sources of information throughout the Far East.

## Blast Furnace Scrap Weaker at Detroit

DETROIT, Sept. 30.—The scrap market reflects curtailed production on the part of consumers, who are showing little interest in forward buying. Blast furnace grades in particular have weakened and are selling at 25c. to 50c. a ton less than a week ago. October scrap lists put out by automobile companies are approximately the same size as in September.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$11.25 to \$11.75
Borings and short turnings	5.50 to 6.00
Long turnings	5.50 to 6.00
No. 1 machinery cast	11.00 to 11.50
Automotive cast	12.25 to 12.75
Hydraul. comp. sheets	11.25 to 11.75
Stove plate	9.00 to 9.50
New No. 1 busheling	9.50 to 10.00
Old No. 2 busheling	5.50 to 6.00
Sheet clippings	8.00 to 8.50
Flashings	10.00 to 10.50

# ▲▲▲ Non-Ferrous Metal Markets ▲▲▲

## Copper at 10c. Lowest in 34 Years—Tin Down to 1922 Levels

NEW YORK, Sept. 30.

### Copper

A new low in 34 years was reached today by electrolytic copper. All producers are now selling the metal at 10c., delivered in the Connecticut Valley. Gradual reductions in quotations, largely by custom smelters since a week ago, when the price was 10.50c., is one of the causes. Effective today, Copper Exporters, Inc., reduced the price to 10.30c., c.i.f. usual European ports. Inquiries from domestic consumers at the new low level are large, but most companies are limiting their sales. The metal cannot be bought beyond December delivery. Consumers abroad are more interested, and sales this morning were more than 1000 tons, with the total for the month probably reaching 25,000 tons, which is better than in August.

Many believe that the market has hit rock bottom but, in view of the recent past, there is nothing certain about this. It is argued that copper is a splendid investment at the 10c. level, but it is also stated that it was a good investment at 11c. Most of the buying is for late delivery, although some sellers report sales for October shipment, indicating that some consumers have booked new business to be fabricated. In general, domestic buying for the immediate future will be largely for investment reasons rather than for actual consumption. Foreign consumers are not covered far ahead. Lake copper is in a position similar to electrolytic copper as to demand, with the quotation 10c. to 10.12½c., delivered.

### Copper Averages

The average price of Lake copper for September, based on daily quotations in THE IRON AGE, is 10.79½c., delivered New York. The average price of electrolytic copper is 10.37½c. refinery, or 10.62½c., delivered in the Connecticut Valley.

### Tin

In sympathy with the decline in commodities in general and in copper in particular, tin has fallen to the lowest level since early in 1922. Spot straits tin was sold yesterday at 28.62½c. This is the lowest price since March 16, 1922, when the same quotation prevailed. Today the quotation was 28.75c., New York. London prices have fallen precipitately and today stood as follows: Spot standard £125 5s., future standard £126 15s., and spot Straits £128 5s., with sales of spot standard at 100 tons and

### THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Sept. 30	Sept. 29	Sept. 27	Sept. 26	Sept. 25	Sept. 24
Lake copper, New York.....	10.12½	10.12½	10.62½	10.62½	10.62½	10.62½
Electrolytic copper, N. Y.*.....	9.75	9.75	10.00	10.12½	10.12½	10.12½
Straits tin, spot, N. Y. ....	28.75	28.62½	...	29.15	29.37½	29.70
Zinc, East St. Louis.....	4.25	4.25	4.25	4.25	4.25	4.25
Zinc, New York.....	4.60	4.60	4.60	4.60	4.60	4.60
Lead, East St. Louis.....	5.35	5.35	5.35	5.35	5.35	5.35
Lead, New York.....	5.50	5.50	5.50	5.50	5.50	5.50

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

future standard at 900 tons. The Singapore price today was £132 10s., with sales at 325 tons. On the decline a very large business has been done in this market, sales totaling several thousand tons, practically all to consumers.

Statistics for September show that the deliveries into consumption in this country were 7250 tons, which were larger than expected. Tin in stocks and landing were 6323 tons. Stocks in London warehouses for the week ended Saturday, Sept. 22, were 25,148 tons, a decrease of 318 tons, the first decline in many weeks.

### Lead

Sharp declines in the London market have affected demand here, and the market is quiet. Thus far prices are unchanged at 5.35c., St. Louis, from the leading producer in that dis-

trict, and at 5.50c., New York, as the contract price of the American Smelting & Refining Co.

### Antimony

In a quiet market Chinese metal is quoted at 7.50c., duty paid, New York, for all positions.

### Zinc

London prices have declined sharply, but there has been no effect on domestic quotations. Prime Western zinc is still strongly held by most producers at 4.25c. a lb., East St. Louis, or 4.60c., New York, though there are rumors that 4.22½c. could possibly be done. A little business is being transacted but naturally the total is not large.

Ore in the Joplin district is unchanged at \$30 a ton, with sales for the week at 7420 tons. Production

### New York, Chicago or Cleveland Warehouse

	Delivered Prices, Base per Lb.
High brass .....	17.00c.
Copper, hot rolled, base sizes.....	20.00c.
Copper, cold rolled, 14 oz. and heavier, base sizes.....	22.25c.
Seamless Tubes—	
Brass .....	22.00c.
Copper .....	22.25c.
Brass Rods .....	15.12½c.
Brazed Brass Tubes.....	24.67½c.

### New York Warehouse

	Delivered Prices, Base per Lb.
Zinc sheets (No. 9), casks .....	9.75c. to 10.25c.
Zinc sheets, open .....	10.75c. to 11.25c.

### Metals from New York Warehouse

	Delivered Prices, per Lb.
Tin, Straits pig.....	31.50c. to 32.50c.
Tin, bar.....	33.50c. to 34.50c.
Copper, Lake .....	11.75c.
Copper, electrolytic .....	11.50c.
Copper, casting .....	11.25c.
Zinc, slab .....	6.00c. to 7.00c.
Lead, American pig .....	6.00c. to 7.00c.
Lead, bar .....	8.00c. to 9.00c.
Antimony, Asiatic .....	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .....	24.00c. to 25.00c.
Alum. ingots, No. 12 alloys .....	23.00c. to 24.00c.
Babbitt metal, commercial grade .....	25.00c. to 35.00c.
Solder, ½ and ¼ .....	22.00c. to 23.00c.

### Metals from Cleveland Warehouse

#### Delivered Prices, per Lb.

Tin, Straits pig.....	34.25c.
Tin, bar.....	36.25c.
Copper, Lake .....	11.63c.
Copper, electrolytic .....	12.25c.
Copper, casting .....	11.25c.
Zinc, slab .....	5.75c. to 6.00c.
Lead, American pig .....	6.25c. to 6.50c.
Lead, bar .....	8.75c.
Antimony, Asiatic .....	12.50c.
Babbitt metal, medium grade .....	17.50c.
Babbitt metal, high grade .....	37.50c.
Solder, ½ and ¼ .....	21.50c.

### Old Metals, Per Lb., New York

*Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses. (Prices quoted are nominal. Holders of metal are generally unwilling to part with stock at present low levels.)*

Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.25c.
Copper, hvy. and wire	8.00c.
Copper, light and bottoms .....	7.00c.
Brass, heavy .....	4.75c.
Brass, light .....	3.75c.
Hvy. machine composition .....	7.25c.
No. 1 yel. brass turnings .....	5.25c.
No. 1 red brass or compositions .....	6.50c.
Lead, heavy .....	4.25c.
Lead, tea .....	3.00c.
Zinc .....	2.25c.
Sheet aluminum .....	7.50c.
Cast aluminum .....	7.00c.

was about 8500 tons and shipments close to 7000 tons, leaving the estimated surplus at 38,178 tons.

#### Nickel

With no change in the long-established quotations, wholesale lots of ingot nickel stand at 35c. a lb., with shot nickel at 36c. and electrolytic nickel in cathodes at 35c.

#### Aluminum

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

#### Non-Ferrous Metals at Chicago

CHICAGO, Sept. 30.—Prices for most non-ferrous metals are leaning to the weak side. Revisions downward this week are especially notable in copper, tin and antimony. Sales are on a par with the volume a week ago. The old metal market is quiet.

*Prices per lb., in carload lots:* Lake copper, 10.62½c.; tin, 29.40c.; lead, 5.45c.; zinc, 4.35c.; in less-than-carload lots, antimony, 8.75c. On old metals we quote copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c. to 7.50c.; red brass, 7c. to 7.50c.; yellow brass, 5c. to 5.25c.; lead pipe, 4c.; zinc, 1.50c. to 1.75c.; pewter, No. 1, 15c.; tin-foil, 17.50c.; block tin, 22.50c.; aluminum, 6.50c. to 7c.; all being dealers' prices for less-than-carload lots.

#### Ohio Foundries Association

The Ohio Foundries Association, Inc., will hold its annual meeting and a sectional conference at the Deshler-Wallick Hotel, Columbus, Nov. 13. Two speakers are scheduled to address a noon meeting on subjects of general interest to all foundrymen, after which those in attendance will divide into four groups for discussion of problems of the different branches of the foundry industry.

Alvan T. Simonds of the Simonds Saw & Steel Co., Fitchburg, Mass., has announced the winners of his annual economic contest for 1929, in which essays were submitted on the subject, "The Federal Reserve System and the Control of Credit." The first prize of \$1,000 was awarded to Walter Earl Spahr, professor of economics and chairman of the Department of Economics, School of Commerce, Accounts and Finance, New York University, and the second prize of \$500 was awarded to Ivan W. Elder, managing editor of the North Pacific Banker, Portland, Ore.

Newark Wire Cloth Co., 351 Verona Avenue, Newark, N. J., manufacturer of wire cloth for all industrial purposes, is now manufacturing wire cloth of stainless steel. This cloth is made in all meshes, widths and lengths, and will be made as fine as 200 x 200 (40,000 openings per sq. in.).

## Reinforcing Steel

### Warehouse for Lehigh Valley

#### Railroad Takes 5000 Tons

WARDS of reinforcing steel the past week amounted to 10,850 tons, the largest total since May 15. The Lehigh Valley Railroad will take 5000 tons for a warehouse in New York. Lettings in September totaled 14,225 tons, compared with 25,500 tons in August. New jobs up for bids call for 3900 tons, the largest, 1000 tons, for a stadium at Cleveland. Estimates on several buildings in Chicago have not yet been given out. Awards follow:

BOSTON, 200 tons, Western Union building, to Concrete Steel Co.  
BERGEN COUNTY, N. J., 1700 tons pavement work on New Jersey side of Fort Lee bridge, to Buffalo Steel Co.  
NEW YORK, 5000 tons, Lehigh Valley Railroad warehouse, Eleventh Avenue and Twenty-sixth Street, to National Bridge Works.  
BROOKLYN, 1000 tons, sewer, Avenue X, to Igoe Brothers.  
HILLSDALE, N. J., 100 tons, hospital for New Jersey Department of Institutions, to Kalman Steel Co.  
BUFFALO, 1000 tons, Ford Motor Co. assembly plant, to Truscon Steel Co.  
WILMETTE, ILL., 100 tons, Bahai Temple, to Concrete Engineering Co.  
CHICAGO, 220 tons, Ogden Avenue bridge, to Olney J. Dean & Co.  
LA GRANGE, ILL., 110 tons, bridge, to Concrete Steel Co.  
ST. LOUIS, 500 tons, section B, Maline Creek sewer for Board of Public Service, to Missouri Rolling Mills Corp.  
LOS ANGELES, 100 tons, power house, 2904 West Eleventh Street, to an unnamed bidder.  
LOS ANGELES, 300 tons, theater, 610

South Broadway, to an unnamed bidder.

LOS ANGELES, 210 tons, store, 610 South Hill Street, to an unnamed company.  
LONG BEACH, CAL., 100 tons, school auditorium, to an unnamed company.  
SAN BERNARDINO, CAL., 200 tons, hospital, to an unnamed bidder.

#### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 800 tons, Riverside Drive ramp from Fort Lee bridge; general contract awarded to William P. McGarry Co., Brooklyn.  
QUANTICO, VA., 800 tons, barracks for United States Marine Corps.  
WASHINGTON, 200 tons, three buildings for Howard University.  
WASHINGTON, 100 tons, hotel; bids open Oct. 1.  
CLEVELAND, stadium, 1000 tons.  
CHICAGO, tonnage being estimated, several public schools.  
CHICAGO, estimates being prepared, Fish Furniture store.  
CHICAGO, 600 tons, International House at University of Chicago; Holabird & Root, architects.  
PHOENIX, ARIZ., 140 tons, bridge on Flagstaff Highway; bids Oct. 15.  
SEATTLE, 400 tons, Edmond Meany Hotel; sub-bids being taken.  
LOS ANGELES, 100 tons, apartment building, 5542 Fernwood Avenue; bids being taken.  
LOS ANGELES, 138 tons, Little Dalton Wash storm drain; Los Angeles Iron & Steel Co., low bidder.  
LOS ANGELES, 301 tons, bridge over Los Angeles River; general contract to Oberg Brothers.  
OAKLAND, CAL., 134 tons, two bridges across Crandall Slough; bids opened.  
SAN FRANCISCO, 400 tons, Mills building; bids Oct. 9.

#### Smaller Imports of Pig Iron

Pig iron coming into the United States in August is reported by the Department of Commerce at 8747 gross tons, compared with 9756 tons in July and with 12,377 tons a year ago. Total for the eight months shows a drop from last year of 13½ per cent. Except for June, the August total was the lowest in more than a year.

British India supplied about 88 per cent of the August imports, compared with less than 60 per cent a year earlier. For the eight months, India supplied more than 75 per cent, against about 41 per cent in 1929.

Imports from India during the eight months have increased by 23,000 tons, whereas imports from all other countries have decreased by more than 35,000 tons.

The Carnegie Steel Co. has placed a contract with the Westinghouse Electric & Mfg. Co., Pittsburgh, for new electrical machinery to be used in construction of its bar mill, now under way at the McDonald plant, Trumbull County. This unit has been under construction for about five months and is scheduled for completion in March, 1931.

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT  
(In Gross Tons)

	August			Eight Months Ended August	
		1930	1929	1930	1929
United Kingdom .....		3,903	7,148	31,187	
British India .....	7,746	7,227	60,497	37,786	
Germany .....		50	50	103	
Netherlands .....	160	737	5,712	19,029	
Canada .....	...	238	392	763	
France .....		...	...	101	
Belgium .....	100	101	100	184	
Norway .....	50	101	2,781	1,441	
Sweden .....	589	106	2,608	1,415	
All others .....	102	65	768	572	
Total .....	8,747	12,377	80,056	92,581	

# Automobile Makers Turn to Lower Prices to Stimulate Sales

DETROIT, Sept. 29.

WITH the motoring public showing extreme conservatism in making purchases of new cars, partly on account of economic necessity and partly because of the desire in the present depression to accumulate rather than expend its resources, it is not strange that automobile manufacturers are turning to deep price cuts or their equivalent as a trump card in their selling program. These makers would be the first to object to characterizing recent developments as the outcropping of a price war; and they would be correct in denying this, for the situation is in nowise a "price war" as one ordinarily thinks of such destructive competition.

The fact is that all companies realize they are facing perhaps the greatest sales resistance in the history of the industry and that the only way to overcome this resistance is to offer the greatest possible value for the smallest amount of money. This is a buyer's market and is likely to continue so for some time. Low prices for a quality article appeal more than ever to the public. It is to this factor that individual makers are looking for support of their selling program.

Prices have been consistently lowered in the small car field. They are on such an economical plane that no spectacular cuts can be expected, although further scaling down in the near future would not surprise the industry. To get a full realization of what has been happening in this field, however, it is necessary to go back only a few years and compare the product then with that which the public is buying for considerably less money today. The public has gained an astonishing advantage.

The same condition exists in the medium-priced field, especially since the vogue for eight-cylinder cars started. The Essex and Pontiac in the lower medium-priced bracket have recently dipped to rock bottom; in the upper medium-priced class the Hudson, Studebaker and Buick have responded to the popular demand for a reduction in prices. Nash is promising the public a new low-priced six and an eight which may be sold for less money than other eights. Studebaker has just announced "free wheeling" as a feature of the new Dictator

In a buyer's market the automobile industry is using low retail prices as a trump card in its selling program.

\* \* \*

Rouge plant of Ford Motor Co. operated on a three-day basis the past week as against a four-day schedule which previously had been consistently maintained since Aug. 4, when operations were resumed following a three weeks' shutdown.

\* \* \*

The motorist paid \$49 less for his car in 1929 than in 1928 and \$135.10 less than in 1927. The average price last year was \$621.75, but that figure should shrink appreciably this year.

\* \* \*

Passenger car production in this country this year has been 89 per cent of the average for the past six years and deliveries 92 per cent.

eight, which bears a close resemblance to the more expensive President and Commander eights. As an extra inducement it offers the Dictator at new low prices ranging from \$1,095 to \$1,250. Even here the downward movement does not stop, for the most astonishing slashes have been made in the quality group. Cadillac models now are selling for some \$900 less than formerly and the new Packard is a full \$1,000 under the old.

ONE may ask how companies can stand successive cuts or sensational drops in prices and still earn dividend requirements. In this regard it must be remembered that profits in recent years have been lucrative and in at least some cases have been far larger than average earnings in other industries. These profits can be pruned without impairing a fair return on the investment. Management, on the other hand, is examining every nook and corner of the production machinery, general overhead and selling department to discover new ways in which economies may be accomplished. The industry is seeking to buy parts and raw materials for less money, it is trying to get lower

freight rates on raw, semi-finished and finished products and wherever possible eliminate this charge entirely. The truth is that much of this effort is for the public's direct benefit, for the savings are being passed along to the car owner in efforts to tempt him to buy a new model instead of making the old one do for another year. In 1929 the motorist paid \$49 less for his automobile than in 1928 and \$135.10 less than in 1927. The average price which he paid last year for his car was \$621.75, but it is safe to say that that figure will shrink considerably before the present year is ended.

## Automobile Makers Holding Output Close to Sales

THAT automobile makers are holding their production schedules close to actual requirements for retail sales is indicated by recent activities. Last week the Buick factory pushed up its output 100 cars a day. This is in accordance with the plan which the company is said to be following of readjusting its factory program every 10 days to conform to the volume of business reported by the sales department. The Rouge plant of the Ford Motor Co. operated on a three-day basis the past week and may do the same this week. The determining factor, as with other companies, will be the responsiveness of the public in buying Ford automobiles. The Chevrolet foundry at Saginaw got into production again on Sept. 22 and its operations in the next 30 days will be heavy. Other departments of the Chevrolet company are ready for a big push in October designed, so it is said, with the object of putting the new models on the market on or as near Nov. 1 as possible. Schedules of other automobile manufacturers have not been materially altered in the past week.

## Chrysler Estimates Increased Production

AT a time when the automobile industry is casting about for facts on which to base a hopeful outlook for 1931, the estimates recently compiled by the statistical department of the Chrysler Corporation, which indicate that output of passenger cars for domestic consumption in the next five

years will be about 20 per cent greater than in the past five years, are attracting attention. This prediction is the result of an analysis covering the past 15 years. The department has found that production of passenger cars this year has been 89 per cent of the average for the past six years and deliveries 92 per cent. Retail sales of passenger cars in this country have been greater than in the corresponding period of 1927 and 1928, but lower

than in the same months of 1925, 1926 and 1929.

The survey reveals that the annual expenditure in the United States for new passenger cars is approximately \$23 per capita, or less than \$2 a month per capita. This optimistic statement by the Chrysler organization should be of special interest to iron and steel makers who are looking to the automobile industry for much of their business.

### New Tariff Commissions Will Consider Pig Iron

WASHINGTON, Sept. 30.—Hearing under the flexible provision of the Hawley-Smoot tariff act will be held by the reorganized Tariff Commission on Oct. 30, while similar hearings will be held in Nov. 5 with regard to wire fencing and wire nettings. These hearings, like 33 others which are before the commission, grew out of resolutions offered in the Senate.

Producers of merchant pig iron and of wire fencing and netting are hoping to get increased duties as the result of the hearings. They will relate to differences in costs in the United States and abroad and other economic factors surrounding the affected industries. Much information with regard to the pig iron situation already is in the hands of the commission and will be brought up to date. The material was obtained when a previous investigation was made and brought about an increase of 50 per cent to a duty of \$1.12½ a ton on pig iron. The Hawley-Smoot duty is 75¢.

The new commission announced dates for hearings under the flexible provision without first supplying domestic manufacturers and importers with preliminary statements of information, as has been done heretofore, but Chairman Henry P. Fletcher said the commission felt it was in such shape that it could go ahead with public hearings. This position was taken because much data to be used had been turned over to the new commission by the old organization.

The Hawley-Smoot flexible provision is designed to expedite investigations and promulgation of new rates. One means to this end is to do away with investigations abroad by commission agents. Instead greater reliance will be placed on ship invoices in getting differences in costs. Mr. Fletcher, however, did not state definitely that the investigations would be speeded up but expressed the hope that the work could be accelerated "without sacrificing the merits of the case." It is certain that the general feeling is that unless the investigations can be speeded up they will be well-nigh worthless. It was the great delay in completing investigations under the old provision that developed a widespread belief that it had little, if any, merit.

The new provision differs from the old one also in that the commission

itself is required to specify the rates necessary to equalize production costs in the United States and abroad and they must be accepted by the President or given a "pocket veto" through his failure to approve the recommendation. A pocket veto would mean that the rates would remain unchanged. As under the old law, rates may not be changed by more than 50 per cent either upward or downward.

### Ford Plant in England Nearing Completion

An article in the September issue of *Anglo-American Trade*, published by the American Chamber of Commerce in London, England, contains the following facts regarding the new plant of the Ford Motor Co. of England, which is nearing completion at Dagenham, at the mouth of the River Thames:

The completed works will cover an area of 110 acres, the entire site consisting of 500 acres. The plant is being built on marshy land, requiring the driving of 10,000 reinforced concrete piles for the foundations. The manufacturing buildings, together with blast furnace, coke ovens and by-product plants, require 12,500 tons of steel. A concrete jetty, 51 ft. wide and 1800 ft. long, is being built for incoming and outgoing shipments. One portion will be reserved for outward shipment and can easily accommodate two 6000-ton ships, while another portion is for the accommodation of vessels bringing coal, ore and limestone to the blast furnace. The steel superstructure extending to the land will carry two Lake type unloaders, with an output of 600 tons per hour each. These will be the largest unloaders in Great Britain. Another portion of the jetty is reserved for handling refuse and will accommodate six 200-ton refuse barges at the same time. Considerable dredging is necessary to provide deep water for steamers to lie alongside this wharf.

The coke oven installation at the Dagenham plant will consist of 45 Wilputte coke ovens, capable of carbonizing 890 tons of coal a day, together with a complete coal and coke-handling plant and a by-product plant for the recovery of tar, and the manufacture of sulphate of ammonia and refined benzol. The coal and coke-handling plant will be almost entirely automatic.

### Railroad Expenditures Large in First Half

Capital expenditures made by Class I railroads in the first half of the present year for new equipment and additions and betterments totaled \$468,305,000. This statement was made in a report submitted last Thursday by R. H. Aishton, chairman of the executive committee of the Association of Railway Executives, at a meeting of the advisory committee of the association at Atlantic City, N.J.

The capital expenditures for the first six months of 1930 were an increase of \$118,000,000 over those in the corresponding period of last year and were made up of \$187,486,000 for new equipment and \$280,819,000 for roadway structures.

Breaking the figures down, the report showed that capital expenditures for locomotives were \$41,251,000; freight cars, \$116,012,000; passenger cars, \$21,663,000; additional main track, yards and sidings, \$52,634,000; heavier rail, \$28,933,000; shops and engine houses, including machinery and tools, \$15,888,000; station facilities and office buildings, \$47,641,000; bridges, trestles and culverts, \$28,975,000; ballast, \$6,151,000; signals and interlockers, including telegraph and telephone lines, automatic train control, and other signal devices, \$20,023,000; other improvements, \$80,574,000.

### Foundry Equipment Orders Much Lower

Orders of the Foundry Equipment Manufacturers' Association were only 85.2 in August, on the basis of 100 as the average monthly shipments in 1922-1924. This is the lowest level for several years, comparing with 90.6 in July and with 229.5 a year ago. A moving average for three months shows 92.6 for August. This compares with 110.2, the three-month moving average for machine tool orders.

Shipments in August were only 82.6, which is the lowest in several years. The comparison is with 116.1 in July and with 150.8 a year ago. Unfilled orders, at 140.2 at the end of August, showed slightly better than the 139.1 for July 31, but were far below the 441.1 of Aug. 31, 1929.

### Scrap Institute Asks Aid of Mills on "Doctored" Cars

The cooperation of steel companies has been asked by the Institute of Scrap Iron and Steel in enforcing the code of business practices for the scrap iron industry. In a letter sent by Benjamin Schwartz, director general of the institute, to all steel mills, attention was called to the fact that complaints concerning "doctored" cars have been well cleaned up during the last two years, as the result of the organization of the institute, the acceptance by the Federal Trade Commission of the code, and the cooperation of the consumers of scrap.

# Steel Exports Make Gain, While Imports Drop Further

WASHINGTON, Sept. 30.—Making the first gain since last March, exports of iron and steel products from the United States aggregated 151,235 gross tons, an increase of 19,463 tons over July. In contrast, imports in August, amounting to 35,387 tons, were the lowest since July, 1924, with a total of 30,410 tons.

Exports in August were 105,948 tons under the 257,183 tons exported in the same month of last year. For the first eight months outgoing shipments, totaling 1,508,008 tons, reflected a decline of 612,938 tons from the same period of last year.

Gains in exports in August, when compared with those in July, were made in three-fifths of the classifications. The only markets showing decreased receipts of American iron and steel were North and Central Amer-

ica, where the drop was slight. The greatest gain was in steel rails, which showed the largest total since April, 1929.

Canada, as usual, was the heaviest buyer of American iron and steel, taking 59,141 tons. Taking 12,124 tons, Chile was the largest market for rails in August.

While there were declines in imports from all the more important supplying countries, the decreases were especially marked in the cases of the United Kingdom, France and Sweden. The heaviest drop was in ferromanganese, which showed a decline of 2784 tons from July. Compared with August of last year, with a total of 84,506 tons, imports showed a drop of 49,119 tons, or 58 per cent. For the first eight months of 1930, incoming shipments, totaling 355,909

tons, were 169,428 tons below those in the corresponding period of 1929. Germany was the largest source of August imports, supplying 9864 tons, of which 2800 tons was sheets.

Of the 7771 tons of manganese ore imported in August, 2557 tons came from the Gold Coast of Africa, 2545 tons from Brazil and 1955 tons from Soviet Russia.

Edward G. Budd Mfg. Co., Philadelphia and Detroit, announces that its affiliated British concern, the Pressed Steel Co. of Great Britain, has received and is executing orders for two new-style, all-steel, single piece body models for two of the largest quantity production automobile manufacturers in England. These orders will increase the 1931 sales of the English company by approximately \$4,500,000.

Exports of Iron and Steel from the United States  
(In Gross Tons)

	August		Eight Months Ended August	
	1930	1929	1930	1929
Pig iron.....	765	2,251	10,389	40,823
Ferromanganese .....	1,077	204	6,569	1,257
Scrap .....	18,607	62,857	311,783	364,293
Pig iron, ferroalloys and scrap .....	20,449	65,312	328,741	406,373
Ingots, blooms, billets, sheet bar.....	165	3,407	14,712	35,881
Skelp .....	7,925	14,962	72,791	82,733
Wire rods .....	3,179	2,969	31,296	31,852
Semi-finished steel .....	11,269	21,338	118,799	150,466
Steel bars.....	4,840	11,962	65,804	135,610
Alloy steel bars.....	291	449	5,211	12,395
Iron bars .....	338	118	1,341	4,039
Plates, iron and steel.....	6,799	13,924	76,309	140,895
Sheets, galvanized steel .....	5,219	11,079	64,971	109,123
Sheets, galvanized iron .....	566	4,711		
Sheets, black steel.....	6,537	16,147	81,299	129,732
Sheets, black iron.....	909	1,564	7,973	10,637
Hoops, bands, strip steel .....	2,196	4,759	30,841	52,488
Tin plate; terne plate .....	21,950	21,367	167,262	174,363
Structural shapes, plain material .....	10,294	21,639	101,392	196,507
Structural material, fabricated .....	8,553	12,638	72,243	77,575
Tanks, steel .....	3,097	1,928	12,565	
Steel rails.....	18,298	12,926	81,344	105,317
Rail fastenings, switches, frogs, etc .....	2,409	2,851	14,604	22,999
Boiler tubes .....	929	1,391	11,030	12,723
Casing and oil-line pipe .....	4,157	7,847	49,160	87,128
Pipe, black and galvanized, welded steel .....	7,985	61,193		
Pipe, black and galvanized, welded iron .....	1,258	11,497	11,885	95,161
Plain wire .....	1,708	2,983	19,106	32,701
Barbed wire and woven wire fencing .....	2,127	4,001	28,311	45,384
Wire cloth and screening .....	214	148	1,240	1,175
Wire rope .....	306	576	3,320	5,233
Wire nails .....	816	733	5,476	9,367
Other nails and tacks .....	459	872	4,295	7,930
Horseshoes .....	57	32	134	252
Bolts, nuts, rivets and washers, except track .....	758	1,589	7,604	10,948
Rolled and finished steel 113,070	163,192	990,624	1,479,682	
Cast iron pipe and fittings .....	1,854	1,732	23,340	22,510
Malleable iron screwed fittings .....	715	833	7,823	8,259
Car wheels and axles .....	1,047	1,104	10,337	15,216
Iron castings .....	417	442	5,066	8,422
Steel castings .....	845	868	7,545	8,133
Forgings .....	712	964	6,512	9,216
Castings and forgings .....	5,590	5,943	60,623	71,756
All other .....	857	1,398	9,221	12,669
Total .....	151,235	257,183	1,508,008	2,120,946

Imports of Iron and Steel Products into the United States  
(In Gross Tons)

	August		Eight Months Ended August	
	1930	1929	1930	1929
Pig iron .....	8,747	12,377	80,056	92,581
Sponge iron .....	2,236	9,021	37,905	58,061
Ferromanganese and spiegelisen* .....	.....	92	162	474
Ferrochrome† .....	84	1,124	3,886	6,340
Ferrosilicon‡ .....	45	...	285	...
Other ferroalloys .....	1,511	12,033	17,240	64,407
Pig iron, ferroalloys and scrap .....	12,623	34,647	139,534	231,863
Steel ingots, blooms, billets, etc .....	1,295	2,639	12,079	18,541
Wire rods .....	317	1,369	6,499	11,207
Semi-finished steel .....	1,612	4,008	18,578	29,748
Concrete reinforcement bars .....	1,747	126	3,778	26,412
Hollow bar and drill steel .....	2,704	3,778	26,412	25,259
Merchant steel bars .....	49	175	803	2,285
Iron bars .....	2	362	1,792	2,818
Iron slabs .....	5	2,927	3,090	19,128
Boiler and other plate .....	2	24	35	149
Sheets, skelp and saw plate .....	2,927	15,695	93,818	103,115
Tin plate .....	5,297	Sheet piling .....	1,517	4,991
Structural shapes .....	2,139	2,139	28,757	5,644
Rails and rail fastenings .....	1,145	Welded pipe .....	2,866	14,918
Other pipe .....	1,489	1,489	28,114	4,269
Barbed wire .....	461	461	3,194	4,269
Round iron and steel wire .....	297	297	3,414	4,073
Telegraph and telephone wire .....	19	19	43	8
Flat wire and strip steel .....	60	60	224	1,464
Wire rope and strand .....	145	145	1,768	1,686
Other wire .....	34	34	240	335
Hoops and bands .....	1,734	7,224	18,427	28,757
Nails, tacks and staples .....	636	636	3,564	6,537
Bolts, nuts and rivets .....	12	12	256	227
Horse and mule shoes .....	2	13	10	25
Rolled and finished steel .....	21,054	37,220	188,789	231,212
Cast iron pipe and fittings .....	28	28	7,920	41,054
Castings and forgings .....	70	70	1,088	1,460
Total .....	35,387	84,506	355,909	525,337
Manganese ore* .....	7,771	32,983	202,100	247,045
Iron ore .....	178,171	298,013	2,123,316	2,067,207
Magnesite (dead burned) .....	3,563	7,517	28,772	19,623

\*Manganese content only.

†Chromium content only.

‡Silicon content only.

# ▲ ▲ ▲ PERSONALS ▲ ▲ ▲

DR. A. S. McALLISTER, an electrical engineer with the United States Bureau of Standards since 1921, has been appointed assistant director in charge of commercial standardization.

FREDERIC M. KREINER, who has been identified with Manning, Maxwell & Moore, Inc., New York, since 1903, has been elected vice-president. He will continue as treasurer of the company, which position he has held since 1920.

DR. C. H. HERTY, JR., supervising chemist in the metallurgical section of the United States Bureau of Mines Experiment Station, Pittsburgh, is to address the Cincinnati chapter of the American Society for Steel Treating, Oct. 2, on "Inclusions in Steel."

L. B. MEAD, for the last two years Indianapolis manager for the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been appointed assistant industrial manager in the Northwest district for that company, with headquarters in Chicago. He went with the Westinghouse company in 1921 and served it continuously in various capacities before going to Indianapolis. WILLIAM J. MORGAN, who has been associated with the Indianapolis office of the Westinghouse company since 1921, succeeds Mr. Mead as manager in that city.

M. M. AUSTIN, research engineer, Fansteel Products Co., Inc., Chicago, is to address the Western Society of Engineers, Chicago, Oct. 2, on "Metals and Alloys for Special Uses."

W. R. JUDSON, Chilean representative of Allis-Chalmers Mfg. Co., Milwaukee, for 13 years, has been appointed managing director of Allis-Chalmers (France), controlling office for all Europe and northern Africa, and will leave Oct. 15 for Paris to assume his new duties. He succeeds H. I. KEEN, who retires after being associated with the company for 25 years, 15 of which were in charge of the Paris office. ERLING WINSNES, for six years representative in Bolivia, has been appointed to succeed Mr. Judson in Chile.

F. MAURICE, commercial manager of Société Genevoise d'Instruments de Physique, Geneva, Switzerland, has arrived in the United States for a stay of about six weeks. During this time he will visit the plants of various machine tool builders in the West and New England and some automobile plants in Detroit.

THOMAS WOODS, assistant to the president of the Carnegie Steel Co.,

Pittsburgh, has been made a director of that company to fill a vacancy on the board caused by the resignation of JOHN S. OURSLER, recently vice-president.

C. F. SPINNING, 201 State Theatre Building, Pittsburgh, manufacturers' representative, has been appointed district representative at Pittsburgh for Doelger & Kirsten, Milwaukee, maker of Milwaukee shears.

ARTHUR S. CUMMINGS has been appointed sales promotion and advertising manager of the American Monorail Co., Cleveland.

DAN B. MOORE has resigned, because of ill health, as superintendent of the Kewanee Boiler Corporation, Kewanee, Ill. He has been with the company since its organization, having started as an office boy. He has been succeeded as superintendent by ROY POWERS.

M. C. PETERSON, formerly a salesman with the L. S. Starrett Co., has joined the sales organization of Wachs, Gregg & Co., Chicago, dealers in machine tools.

HENRY D. SHARPE, president, Brown & Sharpe Mfg. Co., has been reappointed chairman of the committee on foreign commerce of the Chamber of Commerce of the United States.

HENRY BREWER, vice-president and secretary, Winchester Repeating Arms Co., and LESLIE H. THOMPSON, vice-president and treasurer, have resigned and have been succeeded as vice-presidents by EDWARD PUGSLEY, factory superintendent, and CLIFFORD R. BABSON, director of sales. Mr. Thompson will remain as a member of the board. THOMAS C. JOHNSON, product engineer, also has been made a vice-president, RICHARD D. JACK, treasurer, and ARTHUR E. HODGSON, secretary.

M. J. CZARNIECKI has been appointed manager of tubular sales for the A. M. Byers Co., Pittsburgh, according to an announcement by H. W. Rinearson, vice-president. The appointment is in line with departmentalizing sales activities, which has been necessitated by the program of the Byers company to broaden the markets for wrought iron in forms other than pipe. Mr. Czarniecki joined the Pittsburgh sales organization of the Byers company in 1913, and the following year was assigned to the New York office, where he remained until he was transferred to Chicago in 1915. Following the war, he returned to Chicago as district

manager, and the next year was appointed to a similar position in the New York district. In 1925 he became assistant general manager of sales with headquarters at Pittsburgh.

PROF. ELIHU THOMSON, head of the Thomson research laboratory of the General Electric Co., Lynn, Mass., on Sept. 27 was tendered a dinner at the New Ocean House, Swampscott, Mass., in recognition of his completion of 50 years of service to the industry. Approximately 700 were present.

D. H. MILLER, for several years identified with the sales department of the Pittsburgh Crucible Steel Co., Pittsburgh, has become associated with the Hausman & Wimmer Co., Pittsburgh, and will have charge of sales of billets, slabs and sheets.

W. G. McFADDEN has been appointed Detroit manager for the West Leechburg Steel Co., Pittsburgh, succeeding M. F. FINDLEY, who was made general sales manager of the company during the summer. Mr. McFadden has been identified with the company's Detroit sales organization for about five years. WILLIAM R. KUHN, recently New England district manager, has been made Pittsburgh district sales manager. He has been succeeded at Hartford by R. J. SWAN, who has been assistant district manager at Chicago in recent years. Mr. Swan's place at Chicago has been taken by NORMAN H. HALLS, who had recently been identified with the General Fireproofing Co. at St. Louis.

HUBERT ALAN SPENCE THOMAS, of the Melingriffith tin plate works near Cardiff, Wales, is spending several months in the United States and Canada.

## Republic Steel Creates Six Sales Divisions

General sales headquarters of Republic Steel Corporation under Norris J. Clarke, recently named vice-president in charge of sales, will consist of six sales divisions. J. M. Schlendorf continues as manager of sales alloy division; W. F. Vosmer as manager of sales bar division, and J. E. Holmes as manager of sales pipe division. C. E. Hilkert, in addition to being manager of sales of by-products, becomes manager of sales of pig iron. A. R. Johnson, formerly manager of sales of tin plate, becomes manager of sales of sheet and tin plate division, and F. H. Loomis, formerly assistant manager of sales of mild steel products, is made sales manager of the strip division.

Sales headquarters for all divisions

will be at Youngstown, except the alloy division, which will be at Massillon, Ohio.

F. C. Young, general manager of sales of the Union Drawn Steel Co., subsidiary, will move his headquarters from Youngstown to Beaver Falls, and J. S. Langston, sales manager of the die rolling division, will move his headquarters from Youngstown to Buffalo.

### Morgan Engineering Co. to Be Reorganized

The Morgan Engineering Co., Alliance, Ohio, will vote on a plan of reorganization at a special meeting of the stockholders Oct. 21. The plan to be submitted has been approved by the reorganization committee representing both preferred and common stockholders and also by the creditors' committee. Considerable reduction in the debts and bonds of the company have been made since it was placed in the hands of a creditors' committee in 1926. Under the proposed reorganization plan, holders of 8 per cent preferred stock will receive two shares of the new no par accumulated Class A stock and one share of Class B stock, the latter being in lieu of back dividends. Holders of common stock will receive three shares of no par common for each present share.

### Pig Iron and Steel Output in Canada at New Low

TORONTO, Sept. 30.—August production of pig iron, at 57,459 gross tons, was the lowest for any month this year, and was 11 per cent under the 64,676 tons reported for July, and only about half the total of 112,528 tons produced in August, 1929. During the month the output of basic iron fell to 36,067 tons from 42,498 tons in July; foundry iron dropped to 14,114 tons from 22,178 tons in July. Malleable iron totaled 7278 tons against none in the previous month.

There was no change in blast furnaces during the month. Five stacks were blowing at the close, as follows: Steel Co. of Canada, Ltd., Hamilton, Ont., two; Algoma Steel Corp., Sault Ste. Marie, Ont., one; Canadian Furnace Co., Port Colborne, Ont., one, and Dominion Iron & Steel Co., Sydney, N. S., one.

For the eight months ended with August, the production of pig iron was 573,321 tons, a decline of 22 per cent from the 730,871 tons made during the corresponding eight months of last year, which in turn was 12 per cent over the 654,957 tons reported for the same period of 1928.

Output of ferroalloys in August amounted to 3397 tons, a slight increase over the 3334 tons produced in July. For the year to Aug. 31 the total was 51,691 tons, compared with 56,679 tons in the first eight months of last year.

The output of steel ingots and direct steel castings in August, at 57,626 tons, was the lowest for any

month this year, being 16 per cent under the preceding low, 68,424 tons, reported for July, and less than half the total of 120,282 tons made in August, 1929.

For the eight months the production of steel ingots and castings, at 755,043 tons, was 24 per cent less than the 988,951 tons made in the corresponding period of last year.

The Dominion Bureau of Statistics index number on iron and steel and its products declined fractionally from 91.3 in July to 91.2 in August.

of three designs, and if any of them are successful in actual service it will mean large tonnages for the iron and steel mills of the country.

The idea of highways in which iron and steel will be important materials is believed to have first been suggested by Bennett Chapple, vice-president of the American Rolling Mill Co., in an address before the International Acetelyne Association, November, 1929.

## Obituary

WALTER B. EICHLEAY, secretary and treasurer of the John Eichleay, Jr., Co., Pittsburgh, died at the Homeopathic Hospital in that city on Sept. 26, aged 52 years. He had been identified with his father and brothers in the construction firm bearing the family name, during his entire business career.

WILLIAM D. BALDWIN, chairman of the board of the Otis Elevator Co., of which he had been president for many years, died suddenly at his home at Yorktown Heights, N. Y., Sept. 26, aged 74 years. He obtained his first business experience with D. M. Osborne & Co., Auburn, maker of farm machinery, and represented the firm in Europe for five years. He left Osborne & Co. in 1882 to engage in the manufacture of elevators and later bought an interest in Otis Brothers & Co., which later became the Otis Elevator Co.

FRANK J. ADELSBERGER, president of the Hummel Boiler Mfg. Co., St. Louis, died at his home there on Sept. 24 of heart disease. Before joining the Hummel company a year ago he was associated with the Southern Coal, Coke & Mining Co. He was 49 years old.

EDWARD W. HYDE, former president of the Bath Iron Works, Bath, Me., and one of the founders of the Hyde Windlass Co., of that city, died on Sept. 25 in a private hospital in Providence, R. I. He was in his sixty-third year.

WILLIAM H. BOYD, who until recently was production manager of the Westfield Mfg. Co., Westfield, Mass., died at his home in that city on Sept. 24, following a long illness.

WEBSTER L. MARBLE, founder of the Marble Arms & Mfg. Co., Gladstone, Mich., died Sept. 22, following a short illness. During the World War his company made over a million rifle sights for the Allies.

JAMES E. EVANS, in charge of city sales for the S. Obermayer Co., Chicago, recently died following a brief illness. He was born in London, England, 70 years ago and had served the Obermayer company for 40 years.

## Some Improvement in Buying of Machine Tools

**R**EPORTS from leading centers point to a moderate gain in machine tool bookings during the past week. Business has been featured by orders from the American Locomotive Co. for about \$100,000 worth of tools, following purchases of a similar amount recently

for this company's subsidiary, the McIntosh & Seymour Corporation, Auburn, N. Y. All of the new equipment is to be used to carry out a program of plant rehabilitation.

In the New York district some of the machine tool selling agencies have had the best week's business in some

American Locomotive Co.  
Places Orders For About  
\$100,000 Worth of New Equipment

time. It is significant that orders are now being closed with less delay.

While there is nothing to indicate a very active demand for shop equipment over the remainder of the year, it is likely that September will mark the beginning of an upturn, which, however, may be slow in maturing.

### New York

The American Locomotive Co. has placed orders for about \$100,000 worth of machine tools for its plant at Schenectady, N. Y., following purchases of approximately an equal amount a few weeks ago by this company for its subsidiary, the McIntosh & Seymour Corporation, Auburn, N. Y. These purchases are for the purpose of carrying out a program of plant rehabilitation recently decided upon by the American Locomotive Co. and are not indicative of any immediate improvement in the buying of locomotives by the railroads.

Influenced somewhat by this business, but also by the fact that orders from other sources have been larger, some of the local machine tool selling agencies have had the best week's business in months. One firm, in fact, has had its best week of the year. Prospects are more numerous, and less time is now being taken in some cases for manufacturers to come to a decision regarding equipment purchases. A Brooklyn company bought five machines, and orders of this size have not been common lately.

### Cleveland

Dealers report a slight improvement in the machine tool market. While inquiry has been a little better for a few weeks, it was not until the past week that dealers' sales showed any gain. There are no lots of machinery of any size out for quotations, although single tool inquiries are holding up fairly well. September sales by some dealers were slightly more than those in August. However, some machine tool builders did less business in September than

in the previous month. There is nothing at present to indicate a very active demand during the remainder of the year. Some small-lot business is being placed by Detroit automobile manufacturers, but no extensive buying is expected from that source this fall, and railroads are buying practically no equipment.

### Chicago

Sales of machine tools, after having been comparatively quiet for a week, have again become more active, and September purchases give promise of registering a gain over those of the previous month. Buyers' wants vary over a wide range, and individual requests for prices are usually for only one or two machines. A significant fact is that fresh inquiries are being closed faster than heretofore. The same, however, cannot be said of old inquiries, most of which still appear to be alive, but many give little prospect of swelling dealers' books in the near future. The A. O. Smith Corp., Milwaukee, is holding back a list on which it has taken prices, and the Chicago Board of Education appears to be in no hurry to make purchases. That jobbing shops are bidding on more work is shown by the fact that they issue quite a few inquiries for machine tools on which orders are contingent on their obtaining certain contracts for machine work.

### Milwaukee

The fact that some machine tool manufacturers are recalling numerous employees laid off during the summer lull is regarded as among the most favorable developments of the past week. The report, generally, is

that improvement is going on, both as to inquiry and actual orders. Sources of new business cover a wide variety of industry, and include some shops supplying automobile plants with units and parts. The majority of purchases embrace one or two items and are largely for replacement. Prospects for October are believed to be promising.

### Pittsburgh

The trend of the machinery market has been rather mixed in the last week, with several dealers reporting a better-than-ordinary volume of business and others reflecting little activity. Aggregate orders booked by nearly all representatives in this territory are well ahead of August, but that was an extremely poor month, and the improvement in September has not been as definite as might be wished.

New inquiry is coming out in fair volume, and several projects have been revived since the first of the month which were indefinitely delayed earlier in the year. Sizable industrial lists are lacking, and scarcely any railroad buying is reported. The larger steel companies in the district are placing some business and taking estimates on a fair volume of special tools.

### Cincinnati

Machine tool manufacturers in this district report that orders are relatively scarce and represent immediate needs. Inquiry, which has been fluctuating for some time, also slackened the past week. Production continues in keeping with the low demand and no change in schedules is anticipated.

## New York

**SUPERSTRUCTURE** will soon be started for a new super-phosphate plant near Tampa, Fla., for American Cyanamid Co., 535 Fifth Avenue, New York, where work has been under way on a dock and shipping terminal. Initial plant will include power house, machine shop and other mechanical departments, and will cost over \$3,000,000. Project will include storage facilities, conveying and other equipment for distribution of raw phosphate rock.

R. H. Macy & Co., Thirty-fourth Street and Broadway, New York, department store, have awarded general contract to Herbert E. Mitler, Inc., 505 Fifth Avenue, for a one-story automobile service, repair and garage building, 155 x 256 ft., in connection with new storage and distributing terminal at Brooklyn, to cost about \$180,000 with equipment. Robert D. Kohn, Inc., 56 West Forty-fifth Street, New York, is architect.

Board of Education, Park Avenue and Fifty-ninth Street, New York, is considering erection of boys' new vocational school at Sixty-fifth Street and Eighth Avenue, Brooklyn, where site has been purchased, similar to proposed Samuel Gompers Industrial High School for Boys in Bronx for which plans have been drawn. It will cost about \$1,660,000 with equipment. Dr. Joseph M. Sheehan is associate superintendent in charge of industrial education. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect for board.

Abraham Slavin, 2690 University Avenue, Bronx, New York, architect and

engineer, has plans for a one-story automobile service, repair and garage building, 50 x 200 ft., to cost over \$100,000 with equipment.

Irving Block & Die Co., 132 Greene Street, New York, has leased two floors at 7-9 West Thirty-sixth Street for expansion, and will remove to new location.

Ovens, power equipment, conveying and other machinery will be installed in new plant, 60 x 260 ft., to be built by Dugan Brothers, Inc., 290 South Fifth Street, Brooklyn, baker, at White Plains, N. Y., including automobile service and garage unit, to cost \$150,000 with equipment. Henry Holder, 242 Franklin Avenue, Brooklyn, is architect.

Anheuser-Busch, Inc., 721 Pesticozzi Street, St. Louis, manufacturer of beverages, is contemplating purchase of property near New Brunswick, N. J., for new plant for manufacture of containers and cartons, etc., to cost over \$500,000 with machinery.

National Lock Washer Co., 40 Hermon Street, Newark, manufacturer of washers, metal window equipment for railroad cars, marine speedometers, drop forgings, etc., is completing new four-story plant and will concentrate production of all departments in new unit, which will be ready for service before close of year.

Consolidated Film Industries, Inc., Lemoline Avenue, Fort Lee, N. J., has awarded general contract to R. J. Walsh Co., 420 Lexington Avenue, New York, for one-story machine shop, 25 x

240 ft., and one-story storage and distributing building, 25 x 200 ft., to cost about \$70,000 with equipment. Granville W. Dexter, 201 Main Street, Fort Lee, is architect.

General Brass Foundry, Inc., Irvington, N. J., organized by Joseph B. Maier, Newark, and associates, has taken title to property of Sweet Foundry, Irvington, totaling 5000 sq. ft. floor space, for new plant for manufacture of non-ferrous castings.

Harbor Tank Storage Co., Inc., 11 West Forty-second Street, New York, a subsidiary of New York Tank Barge Co., same address, has acquired plant of Lever Brothers Co., Cambridge, Mass., soaps, oils, etc., at Edgewater, N. J., including storage and barging facilities, for new tank storage and distributing unit for oils, food products, etc., to be operated in conjunction with present plants at Weehawken and Guttenburg, N. J.

Board of City Commissioners, Perth Amboy, N. J., is considering extensions and improvements in municipal electric light and power plant, including additional equipment. Dr. John V. Smith is commissioner of public works, in charge.

Barnett Foundry & Machine Co., 536 Lyons Avenue, Irvington, N. J., has contracted with Contra-Flo Co., Ltd., London, England, for manufacturing and sales rights in United States of pumping equipment, feed regulators and other kindred machinery as produced in England, and will arrange part of plant output for new line.

## INDUSTRIAL ACTIVITY

### Prospects Revealed by a Survey of Construction Projects

**C**ONSTRUCTION projects throughout the country, requiring machinery and other equipment reached a total last week in excess of \$86,000,000, of which \$67,000,000 is represented by bond issues of public utility and power companies, the greater part of which will be expended for improvement and expansion of present facilities.

Industrial construction projects total more than \$12,000,000, of which plans of metal-working plants contribute about \$3,000,000, or 25 per cent. Oil company developments total \$2,500,000, including a storage plant in Atlanta, Ga., a refinery addition in Colorado, Tex., and a refinery near Cincinnati, the last mentioned to cost \$1,500,000. Vocational schools in New York, Texas, Maine, Arkansas, Michigan and California reach a total of \$4,000,000 and include two large schools, one in New York to cost \$1,660,000 and a \$1,000,000 manual training school in San Antonio, Tex.

Among the larger industrial construction pro-

jects are a \$3,000,000 coal breaker for the Philadelphia & Reading Coal & Iron Co. at St. Nicholas, Pa., a \$3,000,000 super-phosphate plant near Tampa, Fla., and a \$1,500,000 installation of air-conditioning equipment at the A. O. Smith Corp. plant in Milwaukee.

Projected construction by metal-working plants includes a plant addition by the St. Louis Screw & Bolt Co. to cost \$250,000, a \$60,000 plant for the Welded Products Corporation in Kansas City, Mo., a \$100,000 plant for a zinc products manufacturer at Fort Smith, Ark., and a \$200,000 addition to the plant of the Niagara Falls Smelting & Refining Corp., Buffalo.

Grain operators appear in the industrial construction field with a \$750,000 grain elevator at Louisville, Ky., and a \$200,000 grain milling plant at Springfield, Ore., a \$100,000 plant for a cereal manufacturer at Lockport, Ill., and a \$160,000 plant for a baking company at Sioux City, Ia.

## New England

**C**ONTRACT has been let by Crown Sheet Metal Works, 52 Prest Street, New London, Conn., to Oliver Woodworth Co., 36 Pearl Street, for one-story addition, 36 x 40 ft., to cost about \$18,000.

Commercial Instrument Corporation, Meriden, Conn., operating Tiffany Mfg. Co., and Connecticut Telephone & Electric Co., manufacturer of electrical products, telephone apparatus, etc., with local plant, is arranging for removal of another subsidiary, American Paulin System, Inc., Los Angeles, manufacturer of precision instruments, altimeters, etc., to Meriden, where part of local plant will be given over to such line of output. Company also operates John P. Marsh Co., and Sargent Co., both with plants at Chicago, and Carl A. Norgren Co., Denver.

Public Service Co. of New Hampshire, Manchester, is disposing of a bond issue of \$5,279,000, part of proceeds to be used for expansion and improvements in plants and system.

Southern New England Ice Corporation, Corbin Place, New Britain, Conn., is considering a new artificial ice-manufacturing plant to cost over \$100,000 with machinery. Improvements will also be made in present plant.

United States Cast Magnet Steel Corporation, Lawrence, Mass., recently organized by interests connected with Lawrence Factories, Inc., will occupy part of former local textile plant of Everett Mills, Inc., for production of cast cobalt steel products.

Board of Education, Lewiston, Me., plans installation of manual training equipment in new three-story high school, 133 x 278 ft., to cost about \$300,000, for which Coombs & Harriman, 11 Lisbon Street, architects, are completing plans.

Cumberland County Power & Light Co., Portland, Me., has secured permission to acquire electric power properties, including undeveloped water power sites of Clark Power Co., a subsidiary of Pepperell Mfg. Co., Biddeford, Me., for price of \$2,300,000, and will consolidate with organization. Purchasing company plans expansion, including transmission lines.

G. E. Haynes, 29 George Street, Pittsfield, Mass., architect, has plans for a three-story automobile service, repair and garage building, 100 x 125 ft., to cost about \$120,000 with equipment.

State of Connecticut has plans for State school for boys at Meriden, to contain vocational shops.

Boston & Maine Railroad, Boston, will make improvements at its Worcester shops, including a locomotive washing plant. Fan equipment is required.

Concannon Shear Co., Danbury, Conn., is contemplating erection of a new plant, 40 x 150 ft.

## South Atlantic

**F**Ollowing recent purchase of W. J. Loth Stove Co., Waynesboro, Va., by General Electric Realty Corporation, 120 Broadway, New York, a subsidiary of General Electric Co., Schenectady, plant will be taken over by Edison Electric Appliance Co., 5600 West Taylor Street, Chicago, manufacturer of electric heating appliances, etc., and will be operated as branch, with expansion in output. Edison Electric company is a subsidiary of General Electric Co.

City Baking Co., 308-24 North Gay

Street, Baltimore, has awarded general contract to Consolidated Engineering Co., 20 East Franklin Street, for a one-story automobile service, repair and garage building, 105 x 205 ft., to cost over \$100,000 with equipment.

Board of District Commissioners, District Building, Washington, is asking bids until Oct. 15 for a quantity of water meters.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids (no closing date stated) for a 150-ft. steel radio tower for naval radio station at Jupiter, Fla.; until Oct. 8 for dismantling and reerecting three steel hangars, each about 66 x 140 ft., and for two 100-ft. radio towers for naval station at Quantico, Va.

Metallic Casket Co., Atlanta, Ga., has awarded general contract to Flagler Co., Red Rock Building, for two-story storage and distributing plant, 45 x 145 ft., to cost about \$40,000 with equipment.

Gulf Coast Airways, Inc., Atlanta, Ga., is planning an addition, 80 x 110 ft., to hangar at Candler Field, including additional repair facilities.

Gastonia Belting Co., Gastonia, N. C., manufacturer of mechanical belting, is carrying out expansion program, including installation of additional equipment.

B. C. Goodwin, Clifton Forge, Va., and associates have organized Clifton Forge Machine & Foundry Co., with capital of \$100,000, and plan operation of local foundry, machine and mechanical works.

Seaboard Public Service Co., Salisbury, Md., operating electric light and power properties in Maryland, Delaware, Virginia, North Carolina, Georgia and other States, has disposed of a preferred stock issue to total \$4,700,000, part of fund to be used for extensions and improvements, including transmission lines.

Standard Oil Co., 746 Marietta Street, Atlanta, Ga., has awarded general contract to Flagler Co., Red Rock Building, for one-story addition to oil storage and distributing plant, to cost about \$40,000 with equipment. Company engineering department is in charge.

## Buffalo

**C**OMMON COUNCIL, Buffalo, has authorized call for bids on general contract for new municipal marine airport, consisting of hangar with repair facilities, administration building, and other structures, to cost about \$100,000 with equipment. Bids recently received have been rejected. George F. Fisk, commissioner of public works, is in charge.

Skelton Shovel Co., Dunkirk, N. Y., recently acquired by American Fork & Hoe Co., Keith Building, Cleveland, has work under way on one-story addition, to cost about \$55,000 with equipment. It will be used primarily as a machine shop; other departments will also be expanded.

Niagara Hudson Power Corporation, Electric Building, Buffalo, operating Buffalo General Electric Co., and other utilities, is considering construction of a new hydroelectric generating plant at junction of Hudson and Sacandaga rivers, near Hadley, N. Y., to cost over \$1,500,000 with power transmission system.

U. S. L. Battery Corporation, Highland Avenue, Niagara Falls, N. Y., manufacturer of electric storage batteries, electric arc welders, etc., plans rebuilding part of works recently destroyed by fire,

with loss over \$30,000. Company is a subsidiary of Electric Auto-Lite Co., Toledo, Ohio.

Burnover Stove Corporation, Jamestown, N. Y., care of Roy E. Ulrich, 89 Fairmount Avenue, recently organized by Mr. Ulrich and associates with capital of \$100,000, has arranged for purchase of former local plant of Roberts Machine & Iron Works, 174 Hopkins Avenue, and will remodel for manufacture of gas heating stoves, including parts and assembling. Edward G. Sterling, 421 Murray Avenue, is also interested in company.

Stanley A. Neilson, Gowanda, N. Y., and associates have organized Gowanda Furnaces, Inc., with capital of \$25,000, and plan operation of local plant for production of furnaces, stoves and other heating apparatus. David Bliss, Gowanda, will be an official of new company.

Loco Light Co. of Indianapolis has been purchased by Star Headlight & Lantern Co., 5 Prospect Street, Rochester, N. Y., and business will be transferred to Rochester. Loco Light Co. manufactures steam-driven turbo-generators for locomotives.

Niagara Falls Smelting & Refining Corp., Buffalo, has under way an addition, 50 x 200 ft., to cost about \$200,000 including equipment.

## Philadelphia

PART of No. 1 mill of Cleveland Worsted Mills Co., Allegheny Avenue and Emerald Street, Philadelphia, totaling about 12,000 sq. ft., has been leased by American Tin & Terne Plate Co., Twenty-fourth and Vine Streets, for storage and distribution.

Hawber Mfg. Co., Philadelphia, care of Frank A. Moorshead, Lansdowne, Pa., recently organized by Mr. Moorshead and associates, plans operation of local plant for production of metal stampings, turnings, etc. H. F. Potter, Upper Darby, Pa., and Roland Fleer, Narberth, Pa., are interested in new company.

Philadelphia Barrel Works, Philadelphia, has leased building at 1036-38 North Fourth Street, for new plant for wire-bound kegs, barrels, etc.

C. A. Godshalk, 139 Valley Road, Ardmore, Pa., and associates have organized Godshalk Co., with capital of \$225,000, to operate a plant at Philadelphia for manufacture of electrical and mechanical products, as well as metal fabricated specialties.

Atlantic City Gas Co., Atlantic City, N. J., will dispose of bonds totaling \$698,000, and preferred stock for \$174,000, part of fund to be used for expansion and improvements.

Kent Automatic Parking Garage, Inc., 209 East Forty-third Street, New York, has awarded general contract to Donald M. Love, Inc., Juniper and Walnut Streets, Philadelphia, for a twenty-six story automobile service, repair and garage building on Fifteenth Street, to be operated as Kent Philadelphia Garage, to cost over \$2,000,000 with equipment.

Liquid Carbonic Corporation, 3112 South Kedzie Avenue, Chicago, has acquired plant and business of Keystone Carbonic Gas Co., Highspire, Pa., and will operate as branch plant.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, is considering construction of new central electric-operated coal breaker at St. Nicholas, Pa., to handle output of nine

coal mines, to cost over \$3,000,000 with machinery.

S. V. Reeve, Twenty-first and Hayes Streets, Camden, N. J., manufacturer of stoves, boilers, parts, etc., is planning to rebuild part of foundry destroyed by fire Sept. 25.

Lycoming Paper Box Co., Williamsport, Pa., recently organized by Robert L. Leinbach, 155 East Fourth Street, and associates, plans operation of local factory for manufacture of paper boxes and containers, also combination paper and metal receptacles. V. A. L. Ertel, Williamsport, is identified with new company.

Philadelphia Hardware & Malleable Iron Works, Inc., has removed its offices to State Road and Shelmire Street, Tacony, Philadelphia.

## Detroit

BIDS will be asked in about 30 days by City Council, Wyandotte, for municipal electric light and power plant, to cost about \$300,000 with machinery. Froehlich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is engineer.

Seneca Copper Co., Calumet, Mich., is planning early expansion and betterments at No. 1 shaft, including erection of new rock house, installation of electric pumping machinery, air compressors and other equipment.

United States Tool & Mfg. Co., Dearborn, Mich., recently organized by Cyril E. Bailey, 2520 Lakewood Street, Detroit, and associates, plans operation of plant for manufacture of tools, machine equipment and other specialties. Simon F. Wall and Allan M. Thompson, both of Detroit, are interested in new company.

Superior Block Co., Lansing, Mich., has arranged for a new line of production in connection with a lock-joint casket, and will develop capacity for parts and assembling.

Board of Education, Detroit, is considering installation of manual training equipment in first unit of new Chadsey High School to cost about \$950,000, for which plans are being drawn by N. Chester Sorenson Co., 2231 Park Avenue, architect.

Modell Friedman Steel Corp., 1205 Beaufait Street, Detroit, has arranged for an increase in capital from \$50,000 to \$100,000 for general expansion.

## Pittsburgh

FOLLOWING recent acquisition of Paragon Refining Co., Cincinnati, Gulf Refining Co., Frick Annex, Pittsburgh, is considering erection of new oil refinery near Cincinnati, to cost close to \$1,500,000 with machinery.

K. Simon, 160 Fullerton Street, Pittsburgh, manufacturer of automobile bodies, wagons, etc., has awarded general contract to Harry Dunn, 1014 Locust Street, for a two-story and basement addition, 45 x 65 ft., to cost about \$35,000 with equipment.

Lansberry Hardware Co., Philipsburg, Pa., is planning to rebuild two-story storage and distributing plant destroyed by fire Sept. 23, with loss reported over \$150,000 including equipment.

Charles H. Hays, Jr., North East, Pa., and associates have organized Eureka Electrical Products Co., with capital of \$50,000, and will operate local plant for

manufacture of electrical specialties, mechanical novelties, parts, etc. Charles H. Hays, Sr., will be president and Mr. Hays, Jr., treasurer.

West Virginia Rail Co., Huntington, W. Va., has approved plans for a new unit, to be known as mill No. 2, consisting of main building, 100 x 600 ft., with four bays, two 80 x 250 ft., each, 80 x 370 ft., and 60 x 160 ft. All machinery will be electric-driven and present plant will be completely electrified. Several electric traveling cranes will be installed. Entire expansion will cost about \$235,000. H. A. Zeller is vice-president.

George & Sherrard Paper Co., Wellsburg, W. Va., a subsidiary of International Paper Co., 220 East Forty-second Street, New York, manufacturer of heavy paper bags and containers for cement, plaster, etc., contemplates construction of new branch mill near Los Angeles, to cost over \$100,000.

Reed Electrical Mfg. Co., Pittsburgh, care of C. H. Fleming, 808 Baird Street, Elizabeth, Pa., recently formed by Mr. Fleming and associates, plans operation of local factory for production of electrical and mechanical products. Helene Buechle, 5000 Liberty Avenue, Pittsburgh, is treasurer.

## Chicago

PLANS are being considered by First National Airways, Inc., Elmhurst, Ill., for establishment of airport about seven miles from Hinsdale, Ill., with initial hangar unit, 100 x 200 ft., with repair and reconditioning facilities, to cost over \$80,000 with equipment. Other field units will be built later.

Northern Illinois Cereal Co., Lockport, Ill., is considering rebuilding part of mill recently destroyed by fire, with loss of about \$100,000 including machinery.

R. H. Gray, Austin, Minn., manufacturer of motor truck bodies, tops, etc., has awarded general contract to Schradle & Clark, Austin, for one-story addition, to cost about \$30,000 with equipment.

Ovens, power equipment, conveying and other machinery will be installed in new two-story and basement plant to be built by M. & L. Baking Co., 502 West Third Street, Sioux City, Iowa, to cost about \$160,000. E. R. Swanson, Insurance Exchange Building, is architect.

Central West Public Service Co., Omaha, Neb., is considering one-story addition to steam-operated electric power plant at Westhope, N. D., 75 x 100 ft., to cost over \$100,000 with equipment.

Baker Iron Co., Minneapolis, recently organized, has established plant at 2205 Hiawatha Avenue, and will give over majority of present output to ornamental iron products, fire escapes, etc.

Rocky Mountain Power Co., Helena, Mont., has started work on camp buildings at Polson, Mont., in connection with hydroelectric power project on Flathead River, to include one-story machine shop, electric substation for camp power and lighting, storage and distributing units, and other buildings. Construction will soon begin on power project, to cost over \$15,000,000 with transmission system.

Great Lakes Pipe Line Co., Ponca City, Okla., a subsidiary of Barnsdall Corp., 622 South Michigan Avenue, Chicago, will soon begin construction of gasoline pipe line near Mendota, Minn., comprising a section of a proposed line reported on page 275, issue of July 24.

State Department of Institutions, Capitol Building, St. Paul, Minn., plans cen-

tral steam power plant at epileptic colony at Cambridge, Minn., to cost \$150,000 with machinery. Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, is engineer. W. H. Austin, State Capitol, is commissioner of purchases.

Crane Co. plans to put into production next year a complete line of boilers for domestic and commercial heating plants. Operations will be centered in its Bridgeport, Conn., and Chicago plants.

Jones & Laughlin Steel Corp., Pittsburgh, will erect a one-story addition, 102 x 494 ft., to its warehouse at 2250 West Forty-seventh Street, Chicago.

National Engineering Co., Chicago, has taken over Standard Sand & Machine Co., Cleveland, whose offices have been moved to 549 West Washington Boulevard, Chicago. Standard Sand & Machine Co. will be operated as a subsidiary of National company.

Steel Tank & Products Corp., 4827 South Whipple Street, Chicago, whose plant is at Aurora, Ill., has taken over manufacture and sale of Zeolite water softeners and pressure sand filters for Paige & Jones Chemical Co., Hammond, Ind. Engineering and sales force, which have designed and sold these products for Paige company, have become affiliated with Steel Tank & Products Corp.

## Gulf States

CONTRACT will soon be let by Texas Gulf & Santa Fe Railway Co., Dallas, Tex., for another addition to car and locomotive construction and repair shops at Cleburne, Tex., to cost over \$85,000 with equipment, in connection with expansion and improvements now under way at that place to cost more than \$500,000.

Central Power & Light Co., San Antonio, Tex., is considering construction of a hydroelectric generating plant on Guadalupe River, near Thomaston, Tex., to cost over \$1,000,000 with transmission system.

Southern Kraft Corporation, Panama City, Fla., a subsidiary of International Paper Co., 220 East Forty-second Street, New York, has awarded general contract to Doullut & Ewin Co., New Orleans, for construction of docks in connection with new kraft paper mill, now under way, to be 90 ft. wide and 400 ft. long, including storage and distributing plant on main dock, 90 x 340 ft. Paper mill unit is scheduled for completion at early date and will cost over \$1,500,000 with equipment.

Texas Gas Utilities Co., Del Rio, Tex., is planning construction of natural gas pipe line from Anglin wells, Zavalla County, to Crystal City, Carrizo Springs and vicinity, to cost over \$100,000 with equipment.

Construction Quartermaster, United States Army, Maxwell Field, Montgomery, Ala., is planning early call for bids for erection of four steel hangars, each about 110 x 220 ft., with repair facilities, at local air field.

Col-Tex Refining Co., Colorado, Tex., has authorized expansion improvements at local gasoline refinery to cost about \$100,000 with equipment. Headquarters are at Oklahoma City, Okla. Walter Clarke is one of heads of company.

Board of Education, San Antonio, Tex., will install vocational training equipment in new senior high school in Spanish Acres district, for which general contract has been let to Walsh, Burney & Key, Inc., 928 Flores Street, to cost about

\$1,000,000. Phelps & Dewees, San Antonio, are school architects; W. E. Simpson Co., Milam Building, is engineer.

Southland Greyhound Lines, Inc., 713 Milam Street, Houston, Tex., operating a motor bus system, has awarded general contract to Moody & Hughes, Dallas, for one-story bus service, repair and garage building, 80 x 200 ft. Bertram C. Hill, Construction Industries Building, Dallas, is architect.

Mac Automatic Copy Holder, Inc., Belote Building, South Jacksonville, Fla., recently organized by Dr. D. Milton McCauley, South Jacksonville, and associates, is planning establishment of plant for manufacture of a patented copyholder for typewriters and other service. F. O. Hindle will be in charge of production.

Birmingham branch of Crane Co. has awarded contract to Southern Steel Works Co. for structural steel frame on new shop building, one story, 140 x 200 ft. Martin J. Lide, Woodward Building, Birmingham, is engineer.

## Milwaukee

A NEW branch warehouse and service plant in Milwaukee is being established by General Electric Co., which has leased five and one-half floors in new eight-story express terminal of Milwaukee Electric Railway & Light Co. Shop equipment costing \$150,000 has been ordered. A. L. Pond is manager.

William F. Eichfeld & Son Co. has been organized by William F. Eichfeld, for many years vice-president and general manager of A. F. Wagner Architectural Iron Co., Milwaukee, and his son, W. Kenneth Eichfeld. Plant will be established immediately for production of structural steel, architectural and ornamental iron and general metal building materials. Location will be announced this week.

Milwaukee Department of Public Works is taking bids until Oct. 9 for an elevated steel tank with capacity of 1,500,000 gal., for municipal waterworks. Bond of \$33,000 or check for \$16,500 required with each proposal. David McKeith is commissioner.

Wood & Metal Products Co., Manitowoc, Wis., has been organized by local interests which have bid in plant and property of defunct Weyer Mfg. Co., and will continue manufacture of children's coaster wagons and other wood and metal specialties.

Plant of snow fence division of Wheeler-Arnold Co., Wittenberg, Wis., was burned Sept. 23, with loss of \$25,000. Intentions are to re-establish operation at once, either in leased quarters or new building, and replace equipment.

J. W. Hewitt Machine Co., 131 North Commercial Street, Neenah, Wis., has broken ground for one-story shop addition, 40 x 148 ft., with electric traveling craneway, costing about \$30,000 with equipment now being purchased. It will be used for grinding large paper mill rolls.

A. O. Smith Corp., Milwaukee, has placed contract for complete air conditioning equipment of new \$1,500,000 engineering and research building, eight stories, 170 x 205 ft., with National Carbonic Machinery Co., Chicago. Order is considered one of largest on record.

Unit Corp. of America, Bankers Building, Milwaukee, reports new orders and releases by Fuller gear division, Kalamazoo, Mich., for first three weeks

of September exceeded those of any other month of 1930. October is expected to be largest month in point of shipments made.

Massey-Harris Co., Ltd., Toronto, has stepped up operations at its plant in Racine, Wis., formerly J. I. Case Plow Works, to nearly 100 per cent of capacity and increased payroll to approximately 1000. Racine plant chiefly produces tractors. Implement division will also go on increased schedule shortly. Toronto works, closed for some time for inventory and overhauling, has resumed work, and Batavia, N. Y., branch also has just been started.

## Cleveland

P LANS are under way by Cleveland Wire Works Division of General Electric Co., 1770 East Forty-fifth Street, Cleveland for addition for manufacture of wire filaments for electric lamps and kindred precision wire products, to cost about \$450,000 with equipment.

Master Tire & Rubber Co., Findlay, Ohio, operating Cooper Corporation, with local mill for production of rubber goods, and Fains Rubber Co., Cuyahoga Falls, Ohio, has acquired a controlling interest in Giant Tire & Rubber Co., Findlay, manufacturer of automobile tires and tubes, and will operate as a subsidiary. It is proposed to concentrate production of Cooper and Giant companies in Cooper mill and carry out expansion.

Cleveland Steel Products Co., 7300 Madison Avenue, Cleveland, manufacturer of pumping machinery, oil burners and kindred mechanical equipment, has awarded general contract to H. E. Klefman Co., 2844 Lorain Avenue, for one-story addition, to cost about \$45,000 with equipment. George S. Rider Co., Marshall Building, is architect and engineer.

Owens-Illinois Glass Co., 965 Wall Street, Toledo, Ohio, is considering expansion in certain lines of output, to cost over \$250,000 with equipment.

City Council, Wellsville, Ohio, has approved a fund of \$25,000 for purchase of water meters for municipal water department.

Bixler Co., Fremont, Ohio, recently recapitalized for \$500,000, manufacturer of sectional dining cars, including parts and assembling, is planning removal of plant to Norwalk, Ohio, where it will occupy factory formerly used by A. B. Chase Co., manufacturer of boats. Expansion will be carried out at new location. Fremont Metal Body Co., Fremont, manufacturer of automobile bodies, parent organization of Bixler company, is contemplating a similar removal of plant to Norwalk.

## St. Louis

BIDS are being asked on general contract by St. Louis Screw & Bolt Co., 6900 North Broadway, St. Louis, for one-story addition, 180 x 240 ft., to cost about \$250,000 with equipment. Company engineering department is in charge.

Welded Products Corporation, Seventeenth Street and Cleveland Avenue, Kansas City, Mo., has awarded general contract to John H. Thompson Construction Co., 114 West Tenth Street, for new one-story plant, to cost about \$60,000 with equipment. Frederick H. Michaelis, 114 West Tenth Street, is architect.

Chickasha Cotton Oil Co., Chickasha, Okla., is planning to rebuild part of plant

recently destroyed by fire, with loss over \$100,000 including equipment.

Common Council, Tribune, Kan., plans installation of elevated steel tank and tower in connection with extensions and improvements in municipal waterworks. F. E. Devlin, Wheeler-Kelly-Hagny Building, Wichita, Kan., is consulting engineer.

Rogers Iron Works, Rogers, Ark., recently organized, has leased a local site for erection of one-story plant for general iron and steel working, to cost about \$40,000 with equipment. William Gilbert, Ada, Okla., is head.

Athletic Mining & Smelting Co., South Fort Smith, Ark., is planning to rebuild zinc plant recently destroyed by fire, with loss about \$100,000 with machinery.

Continental Gas & Electric Corporation, 1330 Grand Avenue, Kansas City, Mo., operating Kansas City Power & Light Co., same address, Panhandle Power & Light Co., and other power and light utilities, is disposing of a bond issue of \$16,000,000, part of proceeds to be used for expansion and improvements.

Jonesboro Rice Milling Co., Jonesboro, Ark., recently organized by Harry E. Bovay, Dermon Building, Memphis, Tenn., and associates, has secured local site for erection of rice-milling plant, including screening, conveying and other equipment, storage bins, etc., to cost about \$120,000.

Board of Education, Seminole, Okla., has authorized installation of manual training department in one and two-story addition to high school, for which general contract has been let to R. H. Chase Paving Co., Seminole, to cost about \$100,000. Hawk & Parr, Hales Building, Oklahoma City, Okla., are architects.

St. Louis County (Mo.) Water Co. will spend \$3,500,000 for improvements in plant and distributing system. A new high pressure pumping station, additional purifying facilities and installation of large mains will be undertaken immediately at a cost of \$1,500,000. Additional expenditures of \$2,000,000 are contemplated during next few years.

## Cincinnati

BIDS have been asked on general contract by R. A. Becker Varnish Co., Harrison and Garrard Streets, Cincinnati, for two main one-story units, 75 x 142 ft., and 37 x 109 ft., to cost over \$100,000 with machinery. Rendigs, Panzer & Martin, Southern Ohio Bank Building, are architects.

Eastman & Budke, First National Bank Building, Springfield, Ohio, architects, have awarded a general contract to John Chapman, Springfield, for a one-story automobile service, repair and garage building, to cost about \$125,000 with equipment.

Contracting Officer, Wright Field, Dayton, Ohio, is asking bids until Oct. 8 for 200 gun control switch assemblies, 6000 running light shell assemblies; until Oct. 15 for 60 engine gage units, 20 oil pressure gage assemblies, 325 thermometer gage assemblies, 35 altimeter assemblies.

Tennessee Public Service Co., Newport, Tenn., is arranging for purchase of plants and property of Knoxville Power & Light Co., Knoxville, Tenn., and will operate as one of main units. Expansion is planned, including transmission line construction. Purchasing company has authorized a bond issue of \$7,000,000,

part of fund to be used for acquisition and development. \*Acquiring company is under direction of Electric Bond & Share Co., 2 Rector Street, New York.

Manncraft Airplane Corporation, Collierville, Tenn., has plans for new hangar with repair facilities, 60 x 120 ft., to cost about \$30,000 with equipment.

Ballard & Ballard Co., 912 East Broadway, Louisville, has filed plans for a new grain elevator with capacity of 715,000 bu., to cost about \$750,000 with equipment.

American Blower Corporation, Tennessee Avenue and Reading Road, Cincinnati, manufacturer of mechanical draft equipment, dryers, heaters, etc., with main plant and headquarters at Detroit, has asked bids on general contract for a one and two-story and basement addition, to cost over \$40,000 with equipment. Russell Potter, American Building, Cincinnati, is architect.

## Indiana

PLANS are under way by H. E. LaLabour Foundry Co., Elkhart, for new one-story plant, 30 x 70 ft., to cost about \$24,000 with equipment.

Coca-Cola Bottling Co., Washington, plans installation of automatic bottling equipment, sealing, capping and other machinery, in new two-story plant, 50 x 100 ft., for which bids will soon be asked on general contract. Benjamin Clawson, 503 Pearl Street, is architect.

Mead Johnson Terminal Corporation, Evansville, recently organized by E. Mead Johnson, Sr., head of local Mead Johnson Co., St. Joseph Avenue, manufacturer of prepared foods, has awarded general contract to M. J. Hoffman Construction Co., Furniture Building, for rail and river terminal, 118 x 413 ft., to cost \$400,000, with elevating, conveying and other equipment. Contractor is also engineer for project; Frank Fowler, Furniture Building, is architect.

W. J. Holliday & Co., 545 West McCarty Street, Indianapolis, manufacturer of iron and steel products, is considering purchase of property at Hammond, as site for new mill to cost over \$200,000 with equipment.

## Pacific Coast

CONTRACT has been let by Stockton Fire Brick Co., Russ Building, San Francisco, to Larsen & Larsen, same address, for new plant on 20-acre tract at Pittsburg, Cal., including machine shop, power house and other structures, to cost about \$400,000 with equipment. K. Theill, 580 Market Street, San Francisco, is engineer.

Los Angeles Soap Co., 617 East First Street, Los Angeles, has awarded general contract to Herbert M. Baruch Corporation, Lincoln Building, for five-story and basement storage and distributing plant, to cost over \$125,000 with equipment. Morgan, Walls & Clements, Van Nuys Building, are architects.

Board of School Trustees, Ventura, Cal., has authorized plans for a new manual training school unit at Ventura Avenue school. An automobile service and garage building will also be erected. Roy C. Wilson, 959 Main Street, Santa Paula, Cal., is architect.

Fresno Irrigation District, Griffith-McKenzie Building, Fresno, Cal., is planning an irrigation and hydroelectric power project in Fresno and Madera

counties, to provide for irrigation on 241,300 acres. A power dam 247 ft. high and 3400 ft. long will be built at Friant. Entire project will cost over \$8,000,000. George L. Swendsen, address noted, is chief engineer for District, and has applied to State for permission.

F. C. Stettler Mfg. Co., 300 Oregon Street, Portland, manufacturer of folding paper boxes and containers, has awarded general contract to L. H. Hoffman, Public Service Building, for rebuilding part of plant recently destroyed by fire, to cost over \$250,000 with machinery.

Springfield Mill & Grain Co., Springfield, Ore., is considering rebuilding part of milling plant recently destroyed by fire, with loss over \$200,000 including equipment.

Schichtl Brothers, 1207 South Fifth Street, Yakima, Wash., manufacturers of iron and other metal products, have awarded general contract to Leo S. Ross, 206 East Yakima Street, for one-story machine shop, 50 x 80 ft., to cost about \$20,000 with equipment. An overhead crane will be installed.

W. H. Bristol, Clarkston, Wash., has awarded general contract to J. D. Beery, Clarkston, for a two-story meat-packing plant, 65 x 120 ft., with power plant, 18 x 30 ft., to cost about \$90,000 with equipment.

## Canada

BIDS will be called immediately for erection of several buildings at Brockville, Ont., for Eugene F. Phillips, Ltd., 5795 De Gaspe Street, Montreal. J. M. Miller, 648 Dorchester Street West, Montreal, is architect.

Canadian Industries, Ltd., 1050 Beaver Hall Hill, Montreal, will build a fertilizer plant at Hamilton, Ont.

Norton Co., of Canada, Ltd., Hamilton, Ont., has let general contract to W. H. Cooper, 36 James Street North, for an addition to cost \$20,000.

Crane Co., Ltd., 1170 Beaver Hall Square, Montreal, has awarded general contract to United Engineers & Contractors (Canada), Ltd., 1010 St. Catharine Street West, Montreal, for one-story addition, 130 x 330 ft.

City Council, Hamilton, Ont., will soon call for bids for erection of a \$50,000 machine shop. Equipment will be purchased. S. H. Kent, City Hall, is clerk.

Bids will be called soon for concrete work for foundations for 2,000,000 bu. grain elevator at Lethbridge, Alberta, for Department of Trade and Commerce, Parliament Buildings, Ottawa, Ont. F. C. T. O'Hara, is Deputy Minister.

Clare Brothers & Co., Preston, Ont., manufacturers of stoves, etc., are contemplating plant addition to cost \$50,000.

Several contracts have been let for an addition, 250 x 490 ft., for Anaconda American Brass, Ltd., 98 Stanley Avenue, New Toronto, Ont.

## Foreign

A FUND of \$750,000 has been approved by Municipal Government of Mukden, Manchuria, for local automobile assembling plant, primarily for production of motor trucks of American design. Parts will be purchased for initial operations.

Sydsvenska Kraftalstiebolaget, Stockholm, Sweden, operating electric light and power properties, is considering a

new hydroelectric power project in southern part of country, including construction of power dam near Lake Bolmen, where proposed station will be located. Entire project, including transmission lines, will cost over \$1,000,000.

Koninklijke Nederlandische Zoutindustrie, Borkelo, Holland, manufacturer of chemicals, has approved plans for a new unit for production of salt products, securing raw material from natural brines in district, to cost over \$200,000 with machinery.

German Sinclair Petroleum Corporation, Berlin, Germany, a subsidiary of Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, is planning expansion and improvements to cost over \$1,000,000, including refining, storage and distributing facilities in different parts of country. Harry F. Sinclair, president, is abroad arranging details.

Vauxhall Motors, Ltd., Luton, England, controlled by General Motors Corporation, Detroit, is considering plans for two main multi-story units, totaling about 500,000 sq. ft. floor space, to cost over \$1,500,000 with machinery.

Anglo-Saxon Petroleum Co., Ltd. (Royal-Dutch-Shell), St. Helens Court, London, England, is contemplating a new oil refinery near Buenos Aires, Argentina, to cost over \$1,000,000 with equipment. Project will include an oil storage and distributing plant.

## Coming Meetings

### October

**Associated Machine Tool Dealers.** Oct. 6 and 7. Annual convention, Hotel Aspinwall, Lenox, Mass. A. G. Bryant, 2558 West Sixteenth Street, Chicago, secretary-treasurer.

**Society of Automotive Engineers.** Oct. 7 and 8. Production meeting, Book-Cadillac Hotel, Detroit. R. S. Burnett, 29 West Thirty-ninth Street, New York, director, production activities.

**Gray Iron Institute.** Oct. 8. Annual meeting, Hotel Cleveland, Cleveland. Arthur J. Tuscany, Terminal Tower Building, Cleveland, secretary-manager.

**National Association of Farm Equipment Manufacturers.** Oct. 8 to 10, Congress Hotel, Chicago. H. J. Sameit, 608 South Dearborn Street, Chicago, secretary.

**American Drop Forging Institute.** Oct. 9 to 11. Fall meeting, Briarcliff Lodge, Briarcliff, N. Y. F. W. Sinram, Gears & Forgings, Inc., Cleveland, chairman convention committee.

**American Society of Mechanical Engineers.** Oct. 13 to 15. Fall meeting, French Lick Springs, Ind. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

**Society of Industrial Engineers.** Oct. 15 to 17. Seventeenth national meeting, Mayflower Hotel, Washington. George C. Dent, 205 West Wacker Drive, Chicago, executive secretary.

**Mining and Metallurgical Advisory Boards, Carnegie Institute of Technology and United States Bureau of Mines.** Oct. 17. Fourth annual meeting, Carnegie Institute of Technology, Pittsburgh. John D. Beatty, Carnegie Institute of Technology, secretary.

**American Institute of Steel Construction.** Oct. 28 to Nov. 1. Annual meeting, Carolina Hotel, Pinehurst, N. C. Charles F. Abbott, 200 Madison Avenue, New York, executive director.

## Machine Tool Production Made Large Gain in 1929

WASHINGTON, Sept. 30.—Making the striking gain of 60.9 per cent, the total value of machine tools produced in the United States in 1929 was \$172,349,996, according to the 272 establishments reporting to the Bureau of the Census, against \$107,101,652 reported for 1927 by 276 plants. Miscellaneous products and receipts for repair work, amounting to \$67,742,968, also were reported for last year.

This industry, the bureau's statement says, embraces establishments engaged primarily in the manufacture of that class of power-driven machines generally covered by the designation "machine tools," but does not include certain types of machines designed for working metal, especially sheet metal-working machines, welding machines, wire drawing machines and wire working machines.

## New York Steel Treaters Plan Sessions

Preparations for the monthly meetings of the New York chapter of the American Society for Steel Treating for the coming season have progressed so that a definite announcement is possible for some of the sessions. The first meeting will be Monday evening, Oct. 13, when the chapter will be addressed by Dr. John A. Mathews, vice-president and metallurgist of the Crucible Steel Co. of America, New York, who will discuss the progress in tool steel for the last 20 years. The meeting will probably be held in the auditorium of the Merchants Association, Woolworth Building.

The November meeting on Monday evening, Nov. 10, will take place at the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y. A special program is being perfected. Details of other meetings will be published later.

## August Marks Gain in Gray Iron Castings Demand

Improvement in the demand for gray iron castings for the first time in several months is reported in the August report of the Gray Iron Institute, Cleveland. New business taken during the month, 83 foundries reporting, was 56.3 per cent of normal capacity, compared with 54.2 per cent in July. Unfilled orders, as shown by reports from 76 foundries, were 48.4 per cent of normal, compared with 32.7 per cent in July. Production fell off slightly, being 62.8 per cent as against 63.6 per cent in July, as indicated by reports from 159 foundries.

There was a gain in production to 65.4 per cent from 63 per cent in July in the district including Pennsylvania, Michigan, Ohio, Indiana and the area south and west of the Mississippi River. Production also showed a gain in the district including Wisconsin, Illinois and the territory west of the

Mississippi River, 53 foundries showing a production in August of 65.3 per cent as compared with 61.3 per cent in July. Output in the Chicago district increased from 60.8 per cent to 61.1 per cent.

Foundries with a production of less than 100 tons per month and those having a capacity of over 400 tons per month made the best showing. Those having a capacity of less than 100 tons per month operated at 72.5 per cent in August, compared with 68.4 per cent in July. Foundries making over 400 tons per month ran during August at 63.1 per cent of normal capacity, compared with 53.7 per cent in July. Foundries having a capacity of from 100 to 250 tons per month operated at 62.7 per cent in August as against 69.7 per cent in July, and those with a capacity of 250 to 400 tons per month operated at 58.6 per cent in August, compared with 62.6 per cent during the previous month.

## Hardware Products Valued at \$203,584,745 in 1929

WASHINGTON, Sept. 30.—Hardware to the value of \$203,584,745 was produced in the United States in 1929, according to the Bureau of the Census. This represented an increase of 7.5 per cent, compared with \$189,411,107 reported for 1927.

The 1929 total was made up as follows: Builders' hardware, other than locks, \$54,650,383; casket hardware, \$4,487,107; locks, \$30,407,745; furniture and cabinet hardware, \$14,907,631; piano and organ hardware, \$553,325; saddlery and harness hardware, \$3,935,985; trunk and suit case hardware, \$2,424,264; vehicle hardware, \$60,794,389; other hardware, \$31,423,916.

Among items not covered in the classification of hardware are nails and spikes, wire and wire products, small machines, such as grinders and lawn mowers, plumbers' supplies, tools and cutlery, and screws and bolts.

## Coke Stocks Increase and Production Drops

WASHINGTON, Sept. 24.—Stocks of by-product coke on hand at producers' works increased 13 per cent in August, according to the Bureau of Mines. Nearly all of the increase was at plants not connected with blast furnaces.

Total production of by-product coke in August was 3,637,339 net tons, an average of 117,334 tons a day, a decline of 3.5 per cent when compared with July. Production of beehive coke in August was 169,500 tons, the lowest in any month since the early history of the industry.

Owen Bucket Co., Cleveland, has opened a branch office and warehouse at 36-25 Twenty-second Street, Long Island City, N. Y., in charge of Frank W. S. Elmes. A stock of buckets and parts will be carried. Branch offices were recently opened at Chicago and Oakland, Cal.

## Republic Steel Omits Common Dividend

Directors of the Republic Steel Corp. have voted to omit the dividend on the common stock due at this time. The corporation was incorporated in April and on May 28 declared an initial quarterly dividend of \$1 a share on common stock.

Tom M. Girdler, chairman and president, said:

"During the early months of its existence the corporation has been under heavy organization expense incident to the effecting of a large industrial merger. At the same time the period has been one of severe recession in trade, and directors do not regard a dividend on common stock advisable now."

## Reduced Pig Iron Rates from South to Continue

WASHINGTON, Sept. 30.—Reduced rates on pig iron from blast furnaces to Gulf, South Atlantic and North Atlantic ports and to interior destinations in the East and New England will be continued to Sept. 30, 1931. The lowered rates went into effect in June, 1929. They were filed by Southern carriers at the request of blast furnace interests in the South in an effort to reach wider markets and to reduce surplus stocks. Protests against the rates were made by Northern and Eastern blast furnace interests and by New England and Trunk Line carriers. They asked the Investigation and Suspension Board of the Interstate Commerce last week to suspend the schedules. Southern railroads and Southern pig iron makers asked for extension of the rates. The commission declined to suspend the schedules.

Under the schedules, rates from Birmingham, in gross tons, to typical points in the North are as follows: Baltimore, \$5; Philadelphia, \$5.25; New York, \$5.75; Providence, R. I., and Boston, \$5.75.

## Production Meeting of Automotive Engineers

Papers to be read at the ninth annual production meeting of the Society of Automotive Engineers to be held at the Book-Cadillac Hotel, Detroit, Oct. 7 and 8, include:

"The Future Development of Tungsten Carbide as a Cutting Tool," by W. H. McCoy, General Motors Corp.

"Recent Developments in Aluminum Alloys and Their Fabrication," by R. L. Templin, Aluminum Co. of America.

"The Application of Mathematics to Determine the Effect of Time on Production Cost," by Prof. Paul N. Lehoczky, Ohio State University.

"The Tool Engineer's Place in Mass Production," by O. B. Jones, Detroit School of Applied Science.

"Conveyors in the Automotive Industry," by J. H. Hough, Matthews Conveyor Co.

"Wear Allowances and Tolerance on Gages," E. J. Bryant, Greenfield Tap & Die Corp.

# European Steel Mills in Need of Orders Continue Price Reductions

(By Cable)

LONDON, Sept. 29.

THE National Council of Industry and Commerce has passed resolutions urging that immediate steps be taken to protect home industries by the imposition of appropriate tariffs against foreign imports, which injuriously affect trade and employment, limit the development of imperial resources or hinder cooperation of the component parts of the Empire. It further resolved that the Government must keep expenditure within the capacity of the country to pay and that drastic reduction of taxation is urgently necessary.

## Depression Continues

The iron and steel situation is worse. Dorman, Long & Co. have closed the Acklam mills and blown out one blast furnace. Pig iron consumers are still cautious buyers, but makers are gradually reducing their stocks. Price reductions are declared to be impossible. Finished iron and steel products are dull, and many mills are idle for lack of orders. Some Colonial business is being booked, but the general export demand is negligible.

## British Shipyard Closes

Home shipbuilding orders are scarce, and Cammell, Laird & Co. have closed the Birkenhead yard after launching the last vessel on the stocks.

British industrial council passes resolutions for protective tariff and Government economy.

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American air transport company negotiates for 44-passenger German airplanes.

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Ford Motor Co. building large office building in Cologne, Germany.

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British Government urged to extend credits to pig iron makers as aid to employment.

## European Mills Need Orders

Continental markets are still confused. The price decline is less rapid, but works are finding orders difficult to secure. A slight revival of interest in finished products is reported from India and China.

Welsh tin plate makers have reduced their minimum price 1s. (24c.) per base box to 1s. (\$4.13), base, f.o.b. works port, following sharp reductions in the cost of tin and foreign steel. As there was some heavy merchant selling of tin plate for forward shipments at less than the old schedule of prices, prior to the reduction, mills are expecting these orders to be released in addition to a fresh revival of buying.

Galvanized sheets continue quiet despite recent price reductions. Indian specifications are quoted at £12 8s. 9d. per ton (2.70c. per lb.), cost and freight, while the price to other markets is £11 12s. 6d. per ton (2.52c. per lb.), f.o.b. Black sheets are quiet.

## Disposal of Old Ships Discussed

The Board of Trade has appointed a committee to consider the economic factors involved in the disposal of old ships, and replacement by new ones. It will report on the desirability in the national interest of steps not involving a grant from public funds being taken to encourage this disposal, and will indicate what the steps should be.

Sir John Norton-Griffiths of Norton-Griffiths, Ltd., contractors, which are increasing the height of the Assouan Dam, was found shot in a boat at Cairo, following his suspension of operations because of Egyptian Government interference.

Belgian production in August was 247,000 metric tons of pig iron and 237,000 tons of raw steel.

German raw steel output in August was 897,000 metric tons, rolled steel 620,000 tons.

Luxemburg output in August was 197,000 tons of pig iron and 177,000 tons of raw steel, with 27 furnaces in blast at the end of the month. Production of the Saar in August was 157,000 metric tons of pig iron, 152,000 tons of raw steel and 110,000 tons of rolled steel.

## British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at \$4.8665 (par)

### British Prices f.o.b. United Kingdom Ports

Ferromanganese, export	£11 10s.	\$55.95
Billets, open-hearth	5 15 to 6 5s.	27.98 to \$30.41
Black sheets, Japanese specifications	12 5	59.61
Tin plate, per base box	0 17 to 0 17½	4.13 to 4.25
Steel bars, open-hearth	7 15 to 8 5	1.69 to 1.79
Beams, open-hearth	7 7½ to 7 17½	1.60 to 1.71
Channels, open-hearth	7 12½ to 8 12½	1.66 to 1.87
Angles, open-hearth	7 7½ to 7 17½	1.60 to 1.71
Black sheets, No. 24 gage	9 10 to 9 15	2.06 to 2.12
Galvanized sheets, No. 24 gage	11 12½	2.52

### Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2 12½s. to £2 13s.	\$12.66 to \$12.90
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Billets, Thomas (nominal)	3 12½ to 3 13	17.64 to 17.76
Wire rods, low C., No. 5 B.W.G.	5 2½ to 5 7½	24.94 to 26.15
Rails, light	6 0	29.20
Black sheets, No. 31 gage, Japanese	11 5 to 12 12	54.68 to 58.32 Cents a Lb.
Steel bars, merchant	4 6	0.95
Steel bars, deformed	4 10 to 4 11	0.99 to 1.00
Beams, Thomas, British standard (nominal)	4 1 to 4 3	0.93 to 0.94
Channels, Thomas, American sections	5 12 to 5 14	1.24 to 1.26
Angles, Thomas, 4-in. and larger, over ¾-in. thick	4 5 to 4 6	0.94 to 0.95
Angles, Thomas, 3-in.	3 19 to 4 0	0.87 to 0.88
Hoop and strip steel over 6-in. base	4 17½ to 5 0	1.07 to 1.10
Wire plain, No. 8 gage	5 17½	1.29
Wire barbed, 4-pt. No. 12 B.W.G.	9 15	2.11
Wire nails, base	5 17½	\$1.29 a keg

## More Furnaces Blown Out in Germany

HAMBURG, GERMANY, Sept. 17.—Three blast furnaces at Weidenau, owned by the Lübeck Iron Co. of Lübeck, have been sold for scrapping. The Mannesmann Tube Co. has blown out one of the new furnaces at Hückingen, which began operation about six months ago, so that there were only 74 furnaces in blast throughout Germany at the end of August, compared with 77 at the end of July. Plans for further curtailment of blast furnace operations, if carried out, will leave only 68 or 69 furnaces in blast. German production of foundry pig iron was the lowest in August of any post-war year, except 1923, when the Ruhr was occupied.

Luxemburg producers have experienced little of the general depression of business, but it is noteworthy that the Hadir group of steel mills is beginning to curtail production and reports two furnaces to be blown out and the dismissal of several hundred workers.

## Foreign Rail Makers Retain Prices

HAMBURG, GERMANY, Sept. 13.—The International Rail Makers' Association has retained its export prices on rails at £6 7s. 6d. (\$31) a ton, with open-hearth material at £6 15s. (\$32.84) a ton, f.o.b. Antwerp. This decision was taken despite strong pressure from certain foreign buyers, especially South African, for reductions in price. At the recent meeting of the association it was announced that no agreement had been reached with Japanese producers on shipments to Japan, or the export trade with China and Manchuria.

## Ford Building German Office Structure

Cologne, GERMANY, Sept. 16.—The Ford Motor Co., which is building a large manufacturing plant here, has begun the construction of a \$5,000,000 office building in the city, one of the largest structures of its kind in Germany.

## Junkers Planes May Be Sold to America

BERLIN, GERMANY, Sept. 15.—Scarcity of orders in Germany has made it necessary for the Junkers Aircraft Co. to seek increased export trade. The only important buyer in Germany is the Deutsche Lufthansa, as Germany has no military or naval air forces. About two-thirds of the Junkers output of aircraft is now being sold for export and further increases are expected. The company is now negotiating with an American air transport company for a number of its G-38 type of airplanes, the

largest that are commercially built at present. They accommodate 44 passengers, with cabins in the wings, and require a crew of seven men.

## Briton Urges Government Aid to Iron Makers

WASHINGTON, Sept. 23.—A proposal that the British government should advance credit to pig iron producers to enable them to begin immediate production against requirements in a more prosperous period, has been made by Sir Joseph Calvert, chairman of the Middlesbrough and District Employment Committee. A report from the American Consulate-General in London says that Sir Joseph Calvert emphasizes his belief that the world is not buying its full pig iron requirements, partly because of unsatisfactory international financial conditions. He believes, however, that the Bank for International Settlements will succeed in restoring some European financial stability, which will result in British iron producers receiving increased orders. Extension of credit now would tend to reduce unemployment, effect a considerable saving in payments to unemployed and will be to the advantage of the taxpayer, as the money will be eventually returned with deferred interest.

## General Decline Apparent in World Tungsten Trade

China, most prolific world source of tungsten for the past several years, and the United States, which is the largest consumer of tungsten, both present statistics for the first half of the present year strongly indicative of a declining demand, according to the Minerals Division, Department of Commerce.

This trend appears to have started in the second half of 1929, and, so far as demand is indicated by imports into the United States, to have progressed more rapidly during that period than in 1930, but it is still continuing and the conditions apparently responsible for it are not likely to disappear soon. The great stimulus to sales of tungsten early in 1929, which brought total American imports for that year to more than double their previous post-war record, is believed to be to some extent responsible for the reaction. Expectation of higher consumer prices and of a restricted supply induced heavy buying; with stocks both in the United States and in China above normal, demand has eased off, and a recession of prices has naturally followed.

Files and rasps to the value of \$12,556,019 were produced in 1929 by the 33 establishments reporting to the Bureau of the Census. This was an increase of 1.7 per cent, compared with \$12,346,529 reported for 1927 by 36 establishments.

## New Canadian Tariff Slightly Amended

WASHINGTON, Sept. 30.—The principal amendments made in the proposed changes in the Canadian tariff rates and customs law, before finally approved by Parliament on Sept. 22, have been outlined in a telegram received by the Department of Commerce from Commercial Attaché Lynn W. Meekins, Ottawa.

They include modifications of the rates for a few of the commodities affected and changes whereby deliveries can be made on bona fide contracts under the old rates up to Nov. 30. Also the new rates on repair parts for agricultural implements and machinery have been deferred until next July. The items previously in effect applying to containers made from tin plate have been restored.

## American Companies May Build Canadian Plants

TORONTO, Sept. 23.—One effect of the new Canadian tariff may be to encourage large American companies to establish branch plants in the Dominion. It is reported that the Crucible Steel Co. of America is negotiating for the purchase of a site in Montreal, Toronto or Hamilton, with a view to establishing a Canadian branch plant. Another American steel company, the American Manganese Steel Co., subsidiary of the American Brake Shoe & Foundry Co., is also reported to be looking over the Canadian situation with a similar idea in mind.

## Output of Screw Machine Products High in 1929

Production of screw machine products and wood screws in 1929, by 254 manufacturers reporting to the Bureau of the Census, was valued at \$83,266,687. This figure represents an increase of 66.5 per cent, compared with \$50,009,983 reported by 218 establishments for 1927. Of the 1929 total, \$9,726,556 represented wood screws and \$73,540,131 screw machine products.

Wage earners numbered 18,749 in 1929 and 13,690 in 1927. Their wages were \$26,802,152 and \$18,055,095, respectively.

## Steel Barrel Shipments

Members of the Steel Barrel Manufacturers' Institute shipped 367,422 barrels in August, and had unfilled orders at the end of the month amounting to 352,925, or approximately one month's shipments at the current rate. Business for the month is reported at \$973,112. Capacity was engaged to the extent of only 12.5 per cent for I.C.C. barrels and 36.7 per cent for light barrels, making an average of 31.6 per cent for all barrels.

## Metal Congress Listens to Nearly 100 Papers

(Continued from page 940)

a former Campbell lecturer, paid a compliment to the work of the speaker and pointed to the fact that the oldest lecturer was introducing the youngest thus far. Dr. Grossmann, before commencing his address, referred to the chairman as his friend and counselor.

New light on this subject was thrown by Dr. Grossmann. It is expected that an extended abstract of the lecture can be published soon, so that only a few of the points can be touched on here.

By way of preface Dr. Grossmann said that he had selected his subject as one of the several which Dr. Campbell, in whose memory the lecture was established, was once actively interested in and concerning which several years ago he had made certain statements which have later become unimpeachable.

The various analytical methods for determining oxygen in steel were first

discussed with special reference to the Jordan vacuum fusion method for ascertaining total oxygen. Those for determining the oxide inclusions, or actual residues, by means of which useful information is possible, were also touched on.

### Abnormal Steel Caused by Oxygen

The main part of Dr. Grossman's lecture was a discussion of the effects of oxygen in certain heat-treating reactions, particularly those where the content of oxygen is increased by heat treatment as in carburizing. It was demonstrated by analysis and photomicrographs that certain steels absorb oxygen when carburizing is carried out by means of certain charcoal base solid compounds. This speaker showed that higher manganese steels of certain types reduce this increase in oxygen content.

There followed a discussion to prove that this explanation for soft spots in certain carburized steel—or what are known as "abnormal" steels—is due largely to this absorbed or dissolved oxygen. The steps which led up

to these conclusions were carefully and clearly described.

Then followed the discussion of the results obtained by carburizing with methane gas as a substitute for the charcoal base carburizers. It was demonstrated that the phenomena of soft spots, or areas of ferrite, do not form because there is no oxygen present and that abnormal steels do not result from this method of carburizing.

### Special Dinners and Banquets a Feature

Each of the technical societies participating in the National Metal Congress held special dinners or banquets during the week. They were all well attended.

For the dinner of the A.I.M. and M.E., W. J. MacKenzie, Republic Steel Corporation, Chicago, acted as chairman. Dr. W. H. Bassett, American Brass Co., president of the A.I.M. and M.E., spoke and there were short addresses by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., by Dr. Zay

### Here and There at the Congress

SOME of the visitors were driven about the city from time to time in a new Chrysler 77 which was trimmed largely with "rustless iron"—the hood, the fenders, the radiator, the lamps, the wire wheels and several minor parts. It was built especially for the Rustless Iron Corporation of America, New York and Baltimore. The proud chauffeur was Dr. Simmons of the New York office. It presented a beautiful appearance and attracted much attention, located later in the basement exhibition.

A CLEVER and unusual advertising scheme was put over by the Columbia Tool Steel Co., Chicago. Each day a small four-page newspaper was put under the door of the rooms of visiting delegates. It was called "Columbia Tool Steel News, Steel Treaters' Edition." It contained the daily programs, with illustrations appropriate to the occasion, including photographs of prominent officers and authors of papers. It created much favorable comment.

AN interested visitor from abroad was Lewis Chapman of the Jessop Steel Co., Sheffield, England, who is spending a few weeks in America comparing American and British tool steels. He was under the care of Fred Lantberry of the American branch of the same company, who is a familiar figure at steel treaters' conventions, and who contributed a paper at the Boston convention a few years ago. H. H. Ashdown, a British metallurgist now in this country, was another visitor as well as author of a paper.

A NEAT metal button, a replica of the official emblem of the A. I. M. and M. E., was presented to

each one who registered as a member of that society. It was furnished by the Metropolitan Aircraft Co., 1 Madison Avenue, New York.

THE many friends of Dr. Paul D. Merica, director of research, International Nickel Co., New York, were very glad to see him able to resume his active role in the convention, after a prolonged illness. He was looking the picture of health.

CALIFORNIA was prominent at the Congress. There were five members of the two West Coast chapters, the Golden Gate at San Francisco and the Los Angeles chapters, who were active in promoting the candidacy of F. B. Drake, of the former chapter, for director. They were successful.

BESIDES the small daily paper issued by the Columbia Tool Steel Co., there were two others—the regular convention daily of the *Daily Metal Trade*, Cleveland, and the *Automotive Daily News*, New York, which freely distributed issues each day containing special convention news.

SMALL wooden hammers, with a whistle in the handle, were handed to each man attending the dinner of the institute of metals division and the iron and steel division of A. I. M. and M. E. The ladies were furnished with paper fans, attractively decorated—and they were needed, for the night was a very warm one.

C. E. HOYT, executive secretary of the American Foundrymen's Association, whose headquarters are in Chicago, was a frequent visitor. He was recovering from a severe

attack of hay-fever to recuperate from which he had been north for several weeks. Technical Secretary "Bob" Kennedy was also often seen.

THERE were several chapters of the A. S. S. T. which sent delegations who came in special sleepers. The Boston chapter had a group of about 20, the Hartford aggregation numbered at least 10 and the New York and New Jersey chapters made a group of about 20.

LEARNING a foreign language by a new and novel method was related by a German scientist who has been in this country only four months. He has become the research engineer of a large company and speaks fluent English. When he reached the United States in May, he could not speak English though he could read it. He spent many evenings at the "talkies" and in that way soon acquired proficiency in the language. He relates that he often repeated his hearing of a movie if there was something he wanted to fix more completely in his mind. This is a hint to steel treaters who may some time be similarly placed in Germany or France.

NOT every technical society can boast of feminine members who lend it distinction. Frances Clark, metallographist of the Western Union Telegraph Co., New York, and a member of the New York chapter, was present the entire week. She acted as vice-chairman of the first technical session of the A. S. S. T.

ONE of the new plans of the steel treaters for next year is a dinner meeting of the executives of heat-treating plants.

Jeffries, by R. G. Guthrie, president of the A.S.S.T., and by J. R. Van Pelt, of the Field Museum of Chicago. As the feature of the evening, Dr. B. D. Saklatwalla, vice-president, Vanadium Corporation of America, Bridgeville, Pa., discussed "Vanadium." This was in line with the procedure of previous dinners, such as one at which Dr. F. M. Becket, Union Carbide & Carbon Co., New York, discussed "Chromium," and another at which A. J. Wadhams, manager, research department, International Nickel Co., New York, spoke on "Nickel."

The dinner of the A.S.M.E. was presided over by C. W. Bennett, vice-president, American Sheet & Tin Plate Co., Pittsburgh, and the principal address was made by F. H. Willcox, Freyn Engineering Co., Chicago, who told about Russia.

At the Congress Hotel, where the A.W.S. held all its meetings, a dinner followed by a dance took place the evening of the fourth day.

#### Medals and Honors at Annual Meeting

A GRATIFYING increase in membership of the A.S.S.T. over the last year was reported by W. H. Eisenman, secretary, at the annual meeting of the society which preceded the Campbell memorial lecture. In a combined report of the secretary and treasurer, Mr. Eisenman stated that total membership as of Aug. 31 was 6033, a gain of 7.4 per cent over last year. During the year, the York, Pa., group was added to the society, while the Columbus, Ohio, and Newark, N. J., groups were advanced to chapter rating.

#### Howe Medal Awarded to H. J. French

Herbert J. French, International Nickel Co., Bayonne, N. J., was awarded the Henry M. Howe gold medal, which is presented annually to the author of the best technical paper published in the society's transactions during the past year. Mr. French's paper was entitled "A Study of the Quenching of Steels."

Dr. Zay Jeffries, consulting metallurgist for the General Electric Co., was awarded the past president's medal as a token of appreciation for his work and interest in the society.

#### New Jersey Chapter Gets the Bell

The president's bell and gavel were presented to the Newark, N. J., chapter in recognition of its exceptional progress since organization two years ago. This prize is awarded annually to the chapter which has aided the national officers most and excels in progressiveness in organization and educational features. It remains in the possession of the winning chapter for one year.

#### Next Convention at Boston

The 1931 congress and exposition will be held in Boston the last week in September. A much larger exposition is planned.

The Campbell memorial lecture next year will be delivered by Dr. C. J. Herty, Jr., of Bureau of Mines, Pittsburgh.

## Officers of A. S. S. T. for 1931

**President:** J. M. Watson, Metallurgist, Hupp Motor Co., Detroit.

**Vice-President:** A. H. D'Arcambal, Sales of Small Tools and Metallurgist, Pratt & Whitney Co., Hartford, Conn.

**Secretary (2 years):** W. H. Eisenman, present secretary.

**Directors (2 years):** B. F. Shepherd Ingersoll-Rand Co., Phillipsburg, N. J.; F. B. Drake, Johnson Gear Co., Berkeley, Cal.; R. G. Guthrie, Metallurgist, Peoples Gas, Light & Coke Co., Chicago, retiring president.

## Electrochemists Discuss High-Test Gray Iron

A TECHNICAL society that a few years ago conducted the first round-table luncheon on a technical topic held another one last week in Detroit. In 1923 the American Electric Chemical Society made a decided hit in a round-table discussion on "Electric Furnace Brass Melting." Some 200 men in a Dayton, Ohio, hotel gathered around a number of tables and, under the able direction of Dr. H. W. Gillett as chairman, discussed many of the then new problems in this field. It was a very important meeting. In 1919 and 1920 there were special sessions on electric gray iron.

Since initiating this type of meeting, the A.E.S. has held many such gatherings and the custom has spread to the American Foundrymen's Association, which conducted several at its annual gathering in May at Cleveland, this year, and to other societies.

#### Round Table on Electric Gray Iron

This year the round table on "Electric Furnace Gray Iron" was a feature of the fifty-eighth meeting of the society at the Hotel Statler, Detroit, Sept. 25 to 27. There was a large gathering at the luncheon, held Friday noon, Sept. 26, which was under the chairmanship of Dr. Richard Moldenke. Many foundrymen and some furnace and steel men from the National Metal Congress at Chicago, which was in session Sept. 22 to 26, were present.

Dr. Moldenke introduced the discussion with a paper on "The Production of High-Test Iron." Previous to the luncheon, as the last paper of a general scientific session during the morning, there was a preliminary to the round-table discussion in the form of a paper, "The Detroit Rocking Electric Furnace," by Carl H. Morken, foundry engineer, the Detroit Electric Furnace Co., Detroit. These papers and a review of the discussion, as well as a running account of the round table, will be published in THE IRON AGE in an early issue.

#### Symposium on Corrosion in Automobiles

Another successful round-table discussion was credited to the society. It was organized by the joint efforts

of A. T. Hinckley, U. S. Light & Heat Corporation, Niagara Falls, N. Y., and H. M. St. John, Detroit Lubricator Co., Detroit. The informal discussion lasted well into the late afternoon.

For the first technical session on Thursday, Sept. 25, the electrochemists conducted a symposium on "Prevention of Corrosion in the Automotive Industry." Its organizer was Dr. F. N. Speller, National Tube Co., Pittsburgh, a recognized authority on corrosion. Seven technical papers, most of them relating to plated products or coated metals, were scheduled.

On the convention's last day an electrodeposition program was carried through, made up of seven papers on deposition of nickel, silver, iron-nickel alloys, nickel-cobalt alloys and lead-thallium alloys.

Registration at this convention was large, reaching about 300. This was one of the best attended meetings in several years. The interest in the round-table discussion helped to swell the total. The local Detroit committee of 19 under W. W. McCord, chairman, research engineer, McCord Radiator & Mfg. Co., made the occasion the success it was.

#### Next Convention in Birmingham

The annual spring convention is scheduled for Birmingham, April 23 to 25, at the Hotel Tutwiler. Subjects to be covered include electric steel, electronics used, electrochemistry and ceramics. Papers should be in the hands of the secretary not later than Feb. 15, 1931.

## Cast Iron or Steel Stools for Ingot Molds

(Concluded from page 921)

States and foreign countries, it seems that, without prejudice, the old hole-and-bolt methods of cast-in hooks are still the most desirable ones.

#### Conclusions

Although apparently a casting of the least concern, the ingot mold stool of today is of almost the same importance as regards economy and output as the part it supports, the ingot mold. Therefore, the same consideration to physical, thermal and chemical influences should be given equally to mold and stool. Comparative tests and investigations have revealed the

#### Compositions of Metal in Stools

Type	Chemical Composition							Mold Made of Heats Before Scrapping
	T.C.	Si	Mn	P	S	Cr	Ti	
Gray iron	1.24	0.93	0.136	0.049	...	0.01	Same iron	98
	3.71	1.37	1.03	0.118	0.041	...	Same iron	67
	...	1.59	1.11	0.137	0.038	...	Same iron	58
Alloy gray iron	3.38	1.18	0.96	0.120	0.036	0.94	Without chrome	161
	3.64	1.20	1.18	0.144	0.050	1.23	0.02 Same iron	177
	3.28	1.42	1.28	0.132	0.034	0.88	Without chrome	194
Cast steel	0.39	0.32	0.69	0.041	0.032	0.02	Gray iron	258
Alloy steel castings	0.41	0.38	0.73	0.034	0.028	0.59	Gray iron	279
	0.36	0.26	0.84	0.023	0.019	1.34	Gray iron	342

fact that the adaptation of higher priced materials used in the manufacture of stools is a well-repaying policy for both steel works and rolling mills.

In order to prove definitely which kind of metal would represent the most economical one in works routine, exhaustive comparisons on this subject are always desirable information for present and future decisions in each particular locality. In addition, the stool should continuously receive the same care and attention in design, maintenance and storage as ingot molds. Hence, it is advisable to keep similar records on both of these most important items in the production of sound ingots.

### Strip Steel Annealed

(Concluded from page 919)

When the strips emerge from the lead bath the line of travel changes abruptly from the horizontal to the vertical, as they rise up over a series of rolls, 20 ft. above the floor, and down again. During this travel they cool off sufficiently to enter the pickle vat, wash tank and galvanizing unit. All of these units are placed in one straight line and the strands pass through each in turn. The cooling rolls are adjustable so that they can be lifted to any required height to give the proper cooling period, regardless of the time cycles in the lead and galvanizing baths. In this manner perfect synchronization is obtained.

#### Galvanizing the Product

For galvanizing, the setup consists of wood tanks for holding the galvanizing solution, and the work is electroplated as it passes over zinc bars in the tank. Electric current is furnished by four motor-generator sets.

As the strands pass through and out of this bath they run over pulleys, descend through the floor to the room below, where they change direction over a second set of pulleys and pass through a second galvanizing bath, similar to the one described.

Emerging from the last bath the strands are wound up on 18 coiling reels corresponding to those from which they were unwound. This battery of reels is operated from a single motor-driven shaft equipped with slip clutches.

#### Japanning Equipment Is Provided

In the japanning installation the first unit in line is a gas-fired lead pot for annealing, similar to the one described. There are 20 reels, set on the first

floor, the strands rising through the ceiling and over pulleys to the lead bath on the second floor. In this case bright annealing is desired, and is obtained by cooling the strands in an atmosphere of gas. This atmosphere is confined in a bank of 20 pipes, one for each strand, about 80 ft. long and 1½ and 2½ in. in diameter.

These pipes are located some 10 ft. above the floor and at the charging end are bent down until the ends are submerged just below the level of the molten lead. In this way the pipes are sealed off from the outside atmosphere and the escape of gas which is blown in under pressure is prevented at this end. The strands, after going through these pipes, drop down over a set of pulleys to another set which changes the direction of travel to the horizontal again, so that they will pass through an automatic japanning device and a baking oven, both of which are placed directly under the pipes.

For japanning there is a tank of liquid japan with a series of metal rollers so set in the top that the lower half of each is submerged. The rotation of these rollers coats them with japan and as the strands ride over them they in turn receive a coating of japan.

As this japan must be baked on, the next unit in the line is a gas-fired baking oven made of brick with the gas burners set in the sides. This unit, 30 ft. long, 5 ft. wide and 6 ft. high, is incased in steel plate. There is no hearth and eight tunnel type burners are used, which fire into tunnels running across the oven. The heat is distributed through vents in these tunnels. This oven is carried at 800 deg. Fahr. and this temperature is maintained with the aid of three thermocouples and recording pyrometers. The work remains in the oven from a half minute to a full minute.

As the coiling reels are on the floor below, the strands pass down through the ceiling to them. This battery of coilers is divided into two long rows, and is motor driven. Slip clutches are provided to maintain the correct tension.

### Machine Shop Accounting

(Concluded from page 927)

handled by mechanical tabulation. In this manner, due to the time savings in handling, etc., all accounting may be done daily as the work is completed or materials issued. Thus the final cost may be computed the same day an order is closed.

It is desirable that the original shop cards become the final record cards in as many instances as possible, thereby saving much time and avoiding many errors incident to transferring from one record to another. (See payroll card, Fig. 1).

Fig. 5, a form for recording maintenance work, is another example of what may be done along these lines. The card form is filled out by the workman at the source of the maintenance to be done. The card is then approved by the foreman and by the superintendent. In the meantime the work can be started. The time and materials used are charged to the Maintenance Order on regular time cards and material requisitions, in the same manner as for any other order. When the job is completed the time cards and

## Business as Others See It

WHILE business appears to be on the road to convalescence, the "doctors" are predicting a deliberate sort of recovery. Persistence of unfavorable developments is noted, and few wish to hazard a prediction as to the date of the next "normal." *Annalist*, indeed, selects next April as the "far from absurd" date of the nadir whence the slow climb back to business health is to begin.

That organ believes we are suffering from an "overproduction of optimism," and opines that inventories are not so low as some would have us believe. A survey made by Standard Statistics Co. is pointed to as evidence that "stocks of merchandise in the hands of manufacturers, wholesalers and retailers are only slightly below those of a year ago, when measured in physical units."

But a better sentiment is reported by others, Guaranty Trust Co. of New York among them. That bank finds evidence that buyers are "no longer deferring their commitments in expectation of lower prices." It mentions the prevalence of heavy purchases, for months in advance, by many large industrial consumers of copper, cotton textiles, wheat, sugar and other food products.

And the American Steel & Wire Co., in its latest Crop Report, finds that, from the agricultural viewpoint, "the country at large is in better shape than it was expected to be, only a few brief weeks ago."

During the first half of 1930 the railroads spent one-third more, for new equipment and additions and betterment, than in the first half of 1929. This is cited by *Financial Chronicle*, which, however, reports that the August industrial production (Federal Reserve index) failed to make the usual seasonal gain.

This is at variance with the more recent findings of *Business Week*, which sees a more-than-seasonal expansion in September. But, it says, "the rate of improvement is too slow to warrant expectation of return to normal levels in the remaining months of this year."

Consumption is proceeding faster than production, and stocks, in consequence, are going down, in the opinion of the Union Trust Co., Cleveland. Department store sales, allowing for lower prices, were "practically as large in the first half of 1930 as in the same period in the very active business year 1929."

This same indicator is cited by *Commerce and Finance*, which

### Digest of Current Financial and Economic Opinion

points also to our August exports. These afford "the most positive evidence of business improvement. . . . The chart is now curving upward, and its upward curve is all America needs to re-inspire the enthusiasm now coming to be felt in many directions."

Finally, Alexander Hamilton Institute lists many "straws" showing betterment, including: Greater factory consumption of electricity, higher machine tool orders, increase in exports and in car loadings, better sales of cotton cloth and deliveries of silk, higher woolen mill employment, larger coal output (anthracite going faster than last year), bigger steel production and rubber consumption, more industries showing increase in employment and a halt in commodity price declines.

Besides these statistical factors, a number of economic facts are brought out, such as: Consumers completing installment purchases are now in position to buy; present commodity prices encourage buying; supply of goods is low enough to stimulate replenishment, as a year of recession in production is past; loanable funds ample, at low rates; bonds are providing a source of funds for business expansion.

requisitions are tabulated and the totals transferred to the maintenance order card, which is then punched.

A monthly summary is made of all maintenance order cards completed, and the cards are filed away by equipment numbers. This file then becomes the permanent file of maintenance. Thus, if the plant manager desires to know what the expenditures were for maintenance of any given machine during a given period, the cards are simply taken from the file, and put through the tabulating machine, to get the total cost of maintenance of the machine in question. This total cost may be broken down into hours, labor pay, material cost and amount of burden, as all of this information is punched into the card.

#### Much Added Information Now Available

IT is obvious that there may be many other ways of using information contained on the regular records of time cards and material requisitions. Much of this information, in the past, was not being used to the fullest advantage, due to the laborious methods of sorting, adding and handling. All of this is simplified by the machine method. Reports of a statistical nature may be easily drawn up and other valuable information compiled, in a very short time, which it was not possible to obtain before machine methods were available.

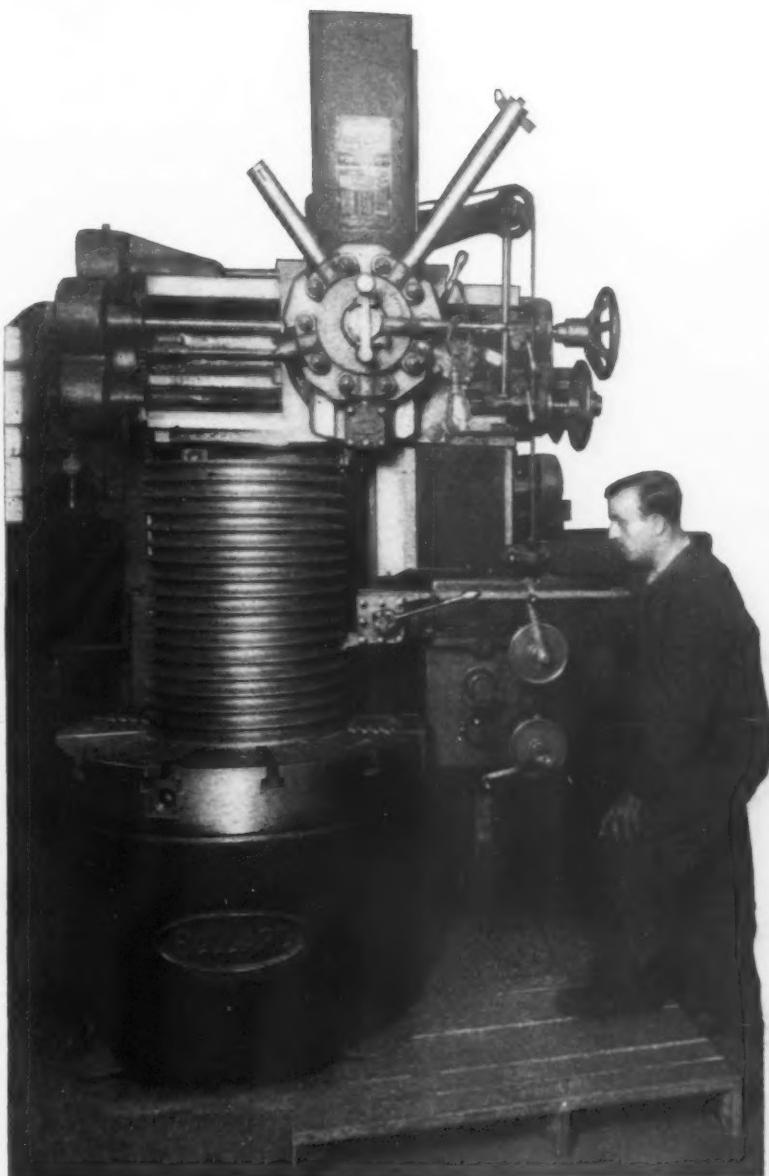
Valuable information regarding sales, by classes of product, territories, salesmen, etc., can be easily obtained. Inquiries for the shop's products may be

classified and the potential markets analyzed. Pattern location records, using code numbers for the various locations, have proved very valuable for controlling insurance, while at the same time furnishing a complete record of patterns and the values, etc.

One record lending itself admirably to this method of accounting is the equipment record, which is a card showing the value, depreciation and other facts pertaining to each item of equipment in the shop. By a system of careful filing of the cards, monthly depreciation charges may be accurately obtained and the entire shop equipment inventoried. The actual figures for depreciation may then be based on the current conditions pertaining to each machine as indicated on the card and punched therein. This does away with the usual approximation or flat percentage of depreciation computation commonly used.

This method, or any other, which tends to make for more accurate accounting for costs, and eliminates the approximations and estimates, is worthy of serious consideration, especially if such methods are more economical as well as more accurate. Mechanical methods are not substitutes for common sense and clear thinking. They are simply an aid whereby the most benefit may be derived from the results of intelligent work, both in shorter time and at less expense.

(In the second and concluding part of this article the author will show how some of the tabulated information is prepared for, and used by, the managing executives of his organization.)



"Profits from within" that economists are talking about show up when you replace older, slower machines with Bullards.

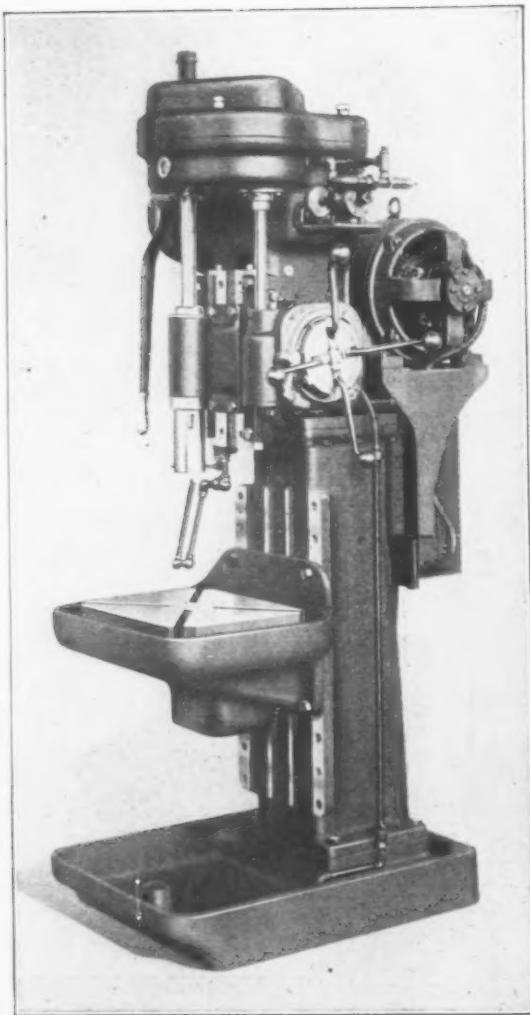
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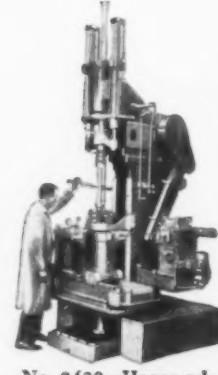
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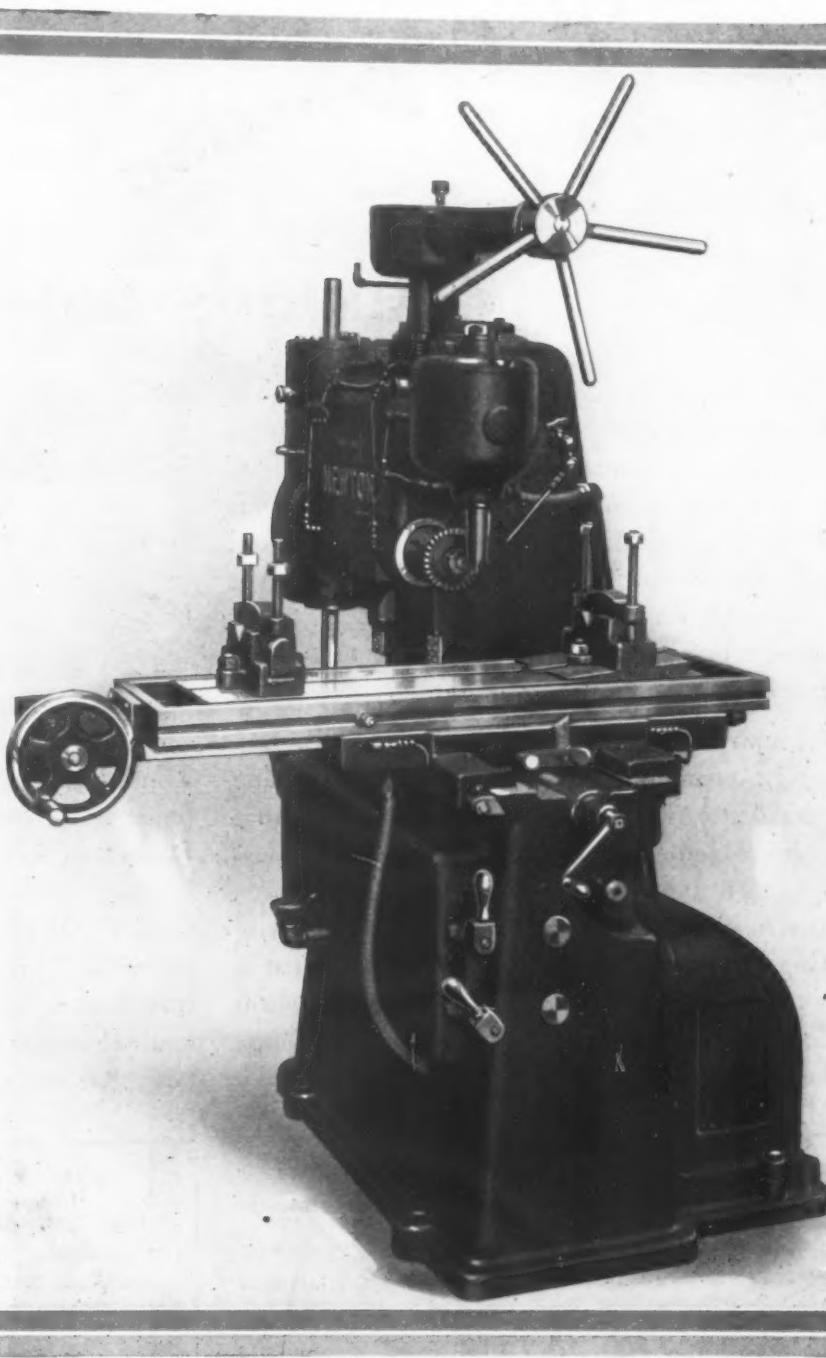
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Key seats are milled the full width, depth, and length in one operation by the cutter on the horizontal spindle. The end mill in the vertical spindle is used only to feather or end keyseats where necessary. No setting is required on this machine beyond clamping the work in the V-blocks, as the table is equipped with stops to locate the work under the cutters.

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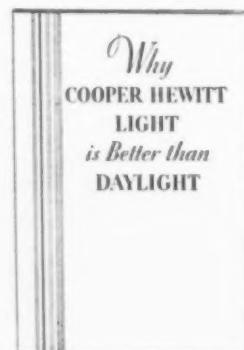
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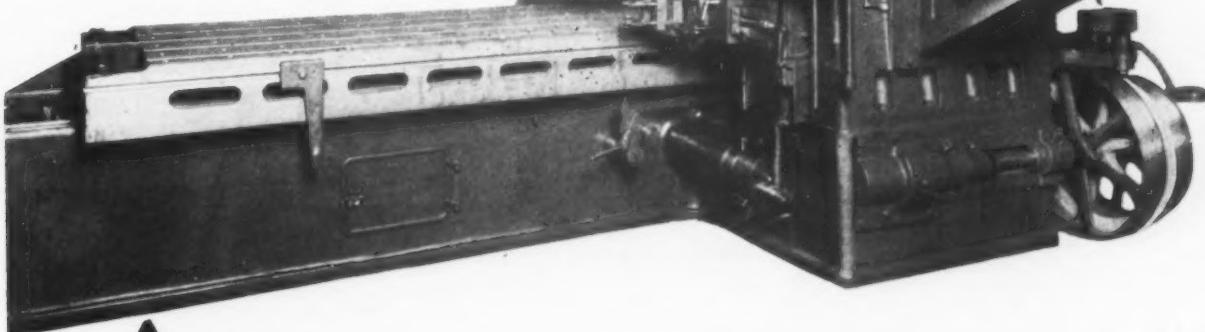
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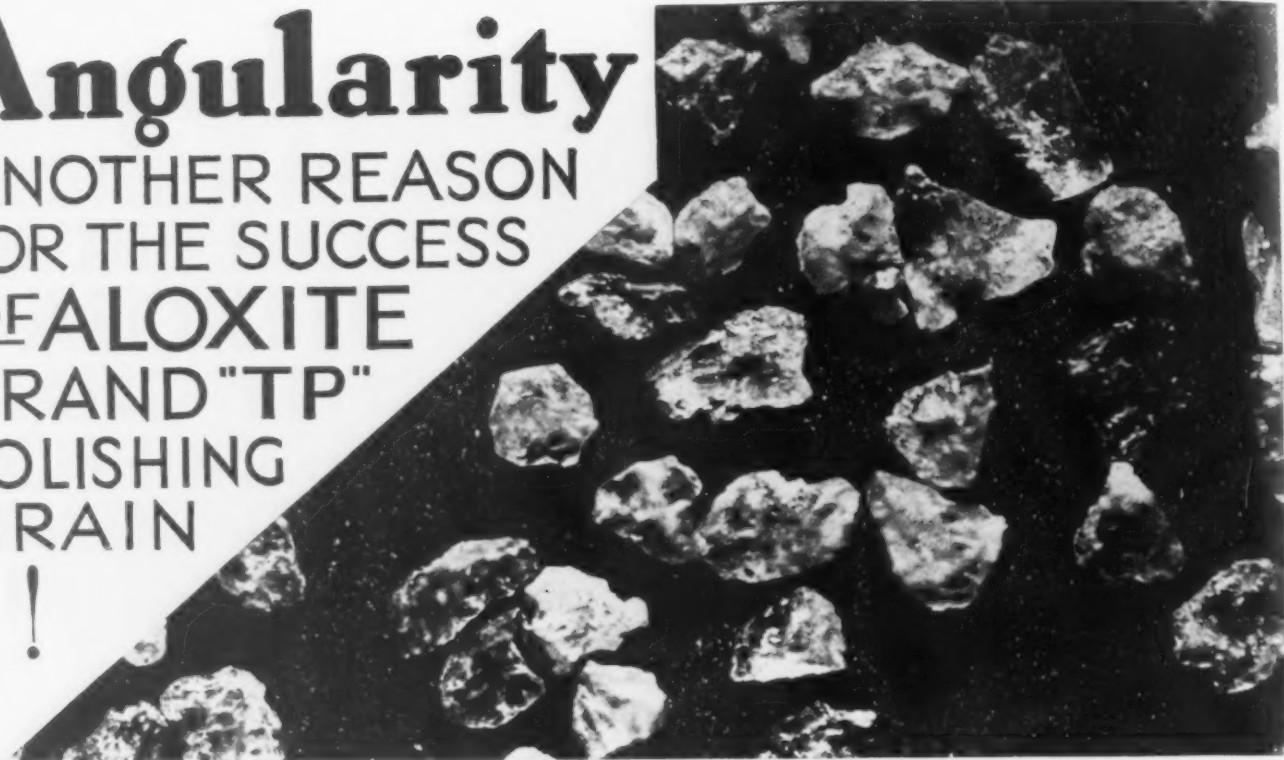
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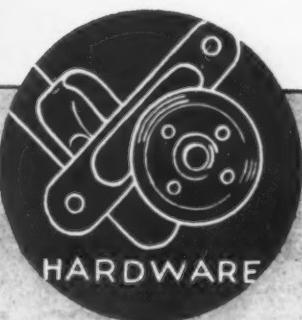
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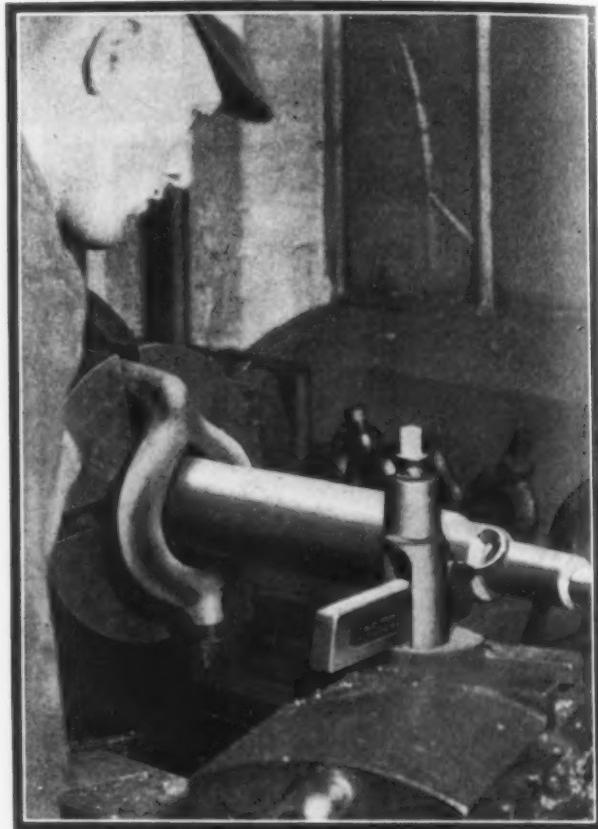
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*Improved Designs,  
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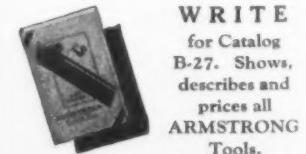
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"The Tool Holder People"

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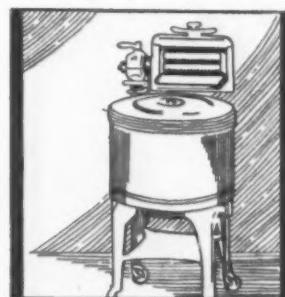
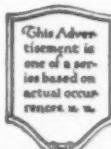
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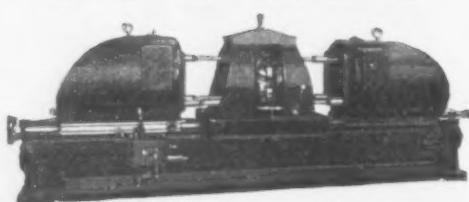
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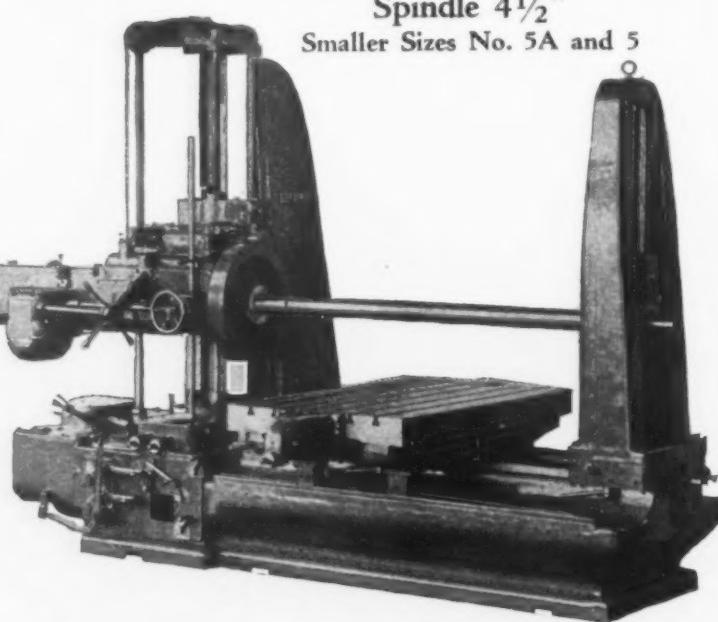
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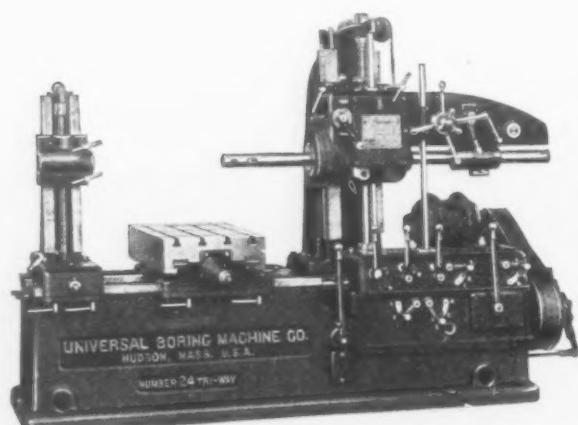
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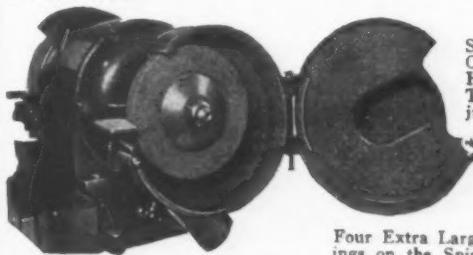
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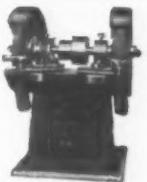
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Blanchard Vertical Surface Grinders for production and accuracy.

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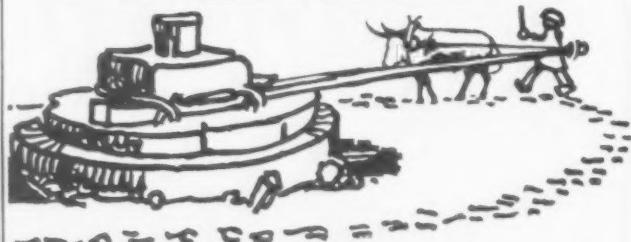
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# GRINDING

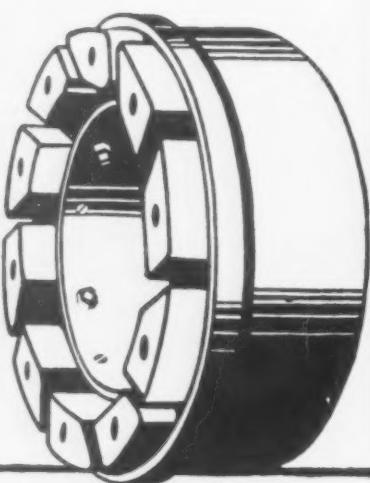


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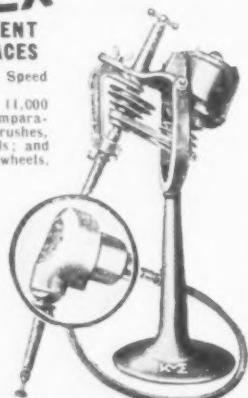
Illustrated machine has grinding wheel capacity  $\frac{1}{2}$ " to 3".

Let us tell you how the High Speed Attachment and the KELLERFLEX Machine can be successfully applied to your needs.

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Pipe Cutting and  
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give Economy  
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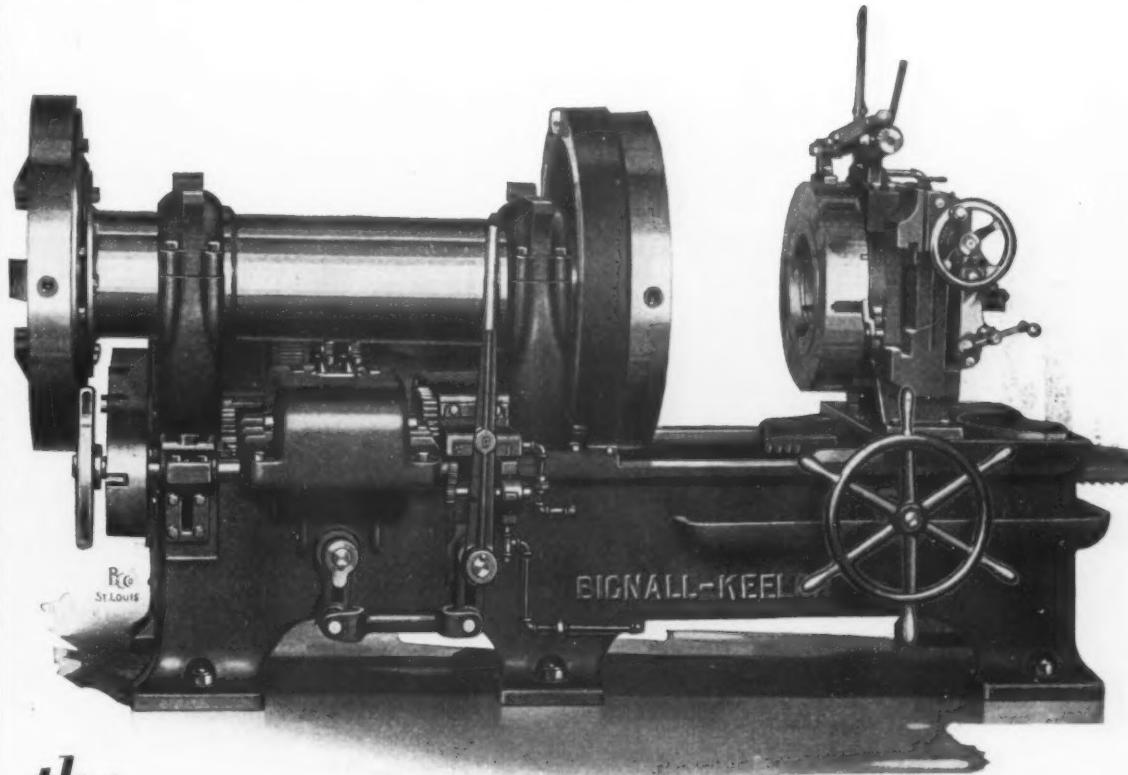
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*Specialists in laying out and designing  
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**CROOKED CUTS WASTE  
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**ACCURACY and SPEED**

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PREFERRED EQUIPMENT**

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SERIES B also available and similar to above except control is by operating valves. Box pistons utilize every bit of compressed air introduced into cylinders. Only 5 packings to every cylinder, each automatically concealed by compressed air, thus eliminating all adjustable packing glands.

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Representatives in All Principal Cities

# ACME, THE ACCURATE THREADER



*May we send some further information?*

**THE ACME MACHINERY CO.**  
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FOREIGN AGENTS: Burton, Griffiths & Co., London, England;  
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**T**HE accuracy of his threader is of vital importance to the man who runs it. He appreciates the real value of a clean, accurate thread and he knows the trouble an inaccurate machine can cause.

This ACME Threader has twenty-five years of accurate service to its credit, and its operator is justly proud of the fact that its twenty-fifth year was as accurate as its first.

From a 6" tie rod to a  $\frac{1}{2}$ " stud, there is an ACME THREADER made to cut cleanly, accurately, and rapidly. Wise shop owners know this and equip new shops or replace worn-out threaders with durable ACME Threaders.

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Brubaker Machine Screw Taps may be had singly or in sets of taper, plug and bottoming, like hand taps. Correctly designed; true in pitch, lead and diameter, they cut fast with minimum breakage and insure tapping accuracy.

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Factory: MILLERSBURG, PA.

Sales Office

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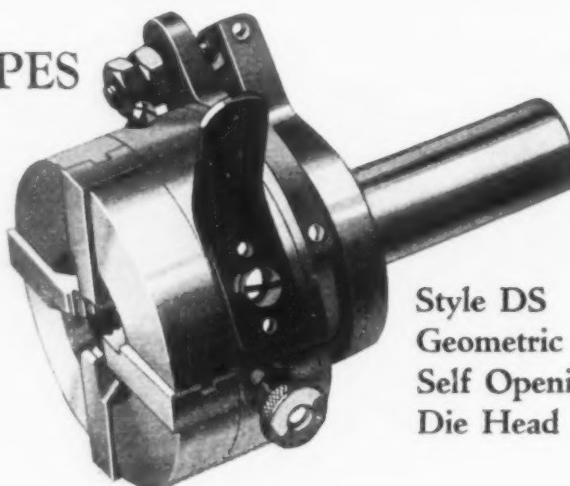
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The Chasers are cam operated, therefore positive. The Head is sturdy and strong. A floating shank and an adjustable trip make possible sensitive tripping and assure you of concentric threads, threads of precise lengths without the use of close camming.



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Geometric  
Self Opening  
Die Head

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Makers also of Collapsing Taps, Solid Adjustable Taps and Threading Machines



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better performance  
from them all.**

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The same careful selection of steel, the same rigorous inspection, the same mastery of heat treating methods make every Morse Tool a reliable factor in speedy production.

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CUTTERS  
TAPS AND DIES  
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**A Liberal Offer  
to cut Your Threading Costs**

# NOW!

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- Freedom from threading annoyances

We are making it possible for you to invest in a sure thing. Simply let us know size and type of machine and a description of the thread.

All of the many styles of H & G *Die Heads* and *Threading Machines* are alike designed to increase earning capacity through consistent and efficient operation.



Just a line on your company letterhead will promptly bring your copy of the "Threaded Part Data Book," which contains valuable information in connection with the manufacture of threaded parts.

**The EASTERN MACHINE SCREW CORPORATION**

TRUMAN & BARCLAY STS.,  
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**MURCHEY Self-Opening Non-Rotating Die Head**

Especially adapted to precision work. Chasers easily removed without taking off cap. Write for details.

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951 PORTER ST., DETROIT, MICH.

**THE SAFETY GRINDING WHEEL & MACHINE CO.**

"Since 1892"

Springfield  
Ohio



**Emery Wheel Dressers**

**CUTTERS** Nos. 1-2

We make the regular Huntington (Pattern) for all sizes. Roughing for Nos. 1 and 2. Paragon for No. 1 only.

**GEO. H. CALDER, Lancaster, Pa., U. S. A.**

**Pointers on Buffs for the Purchasing Agent**  
*Copy mailed on request*

**Divine Brothers Company**

Utica, N. Y., U. S. A.

*Abrasives Metal Finishing Engineers*

**A Word of Caution to Users of Diamond Tools**

To give satisfactory service a DIAMOND TOOL should be set with carefully selected whole stone, free from fractures and suitable for the use for which it is intended. Such a tool can be relied upon to give the maximum amount of service with a minimum of wear on the DIAMOND.



THOS. L. DICKINSON, 34 Gold Street, New York City  
Successor to John Dickinson

Established 1796

**METAL SAWS—INSERTED TOOTH SAWS—RIVET SETS—  
CHISEL BLANKS—HIGH SPEED CUT-OFF MACHINES**

For standard or special requirements. Specify **HUNTER** and insure lower production costs. Ask us for proof.

**HUNTER SAW AND MACHINE CO.**  
5660 BUTLER STREET, PITTSBURGH, PENNA.

Atkins SILVER STEEL Metal Cutting Saws, SILVER STEEL Hack Saw Blades, Kwick-Kut Hack Saw Machines and Metal Band Saw Machines give you more for your money. The wise buyer purchases Atkins products.

Send for "Saws in Shop" book.

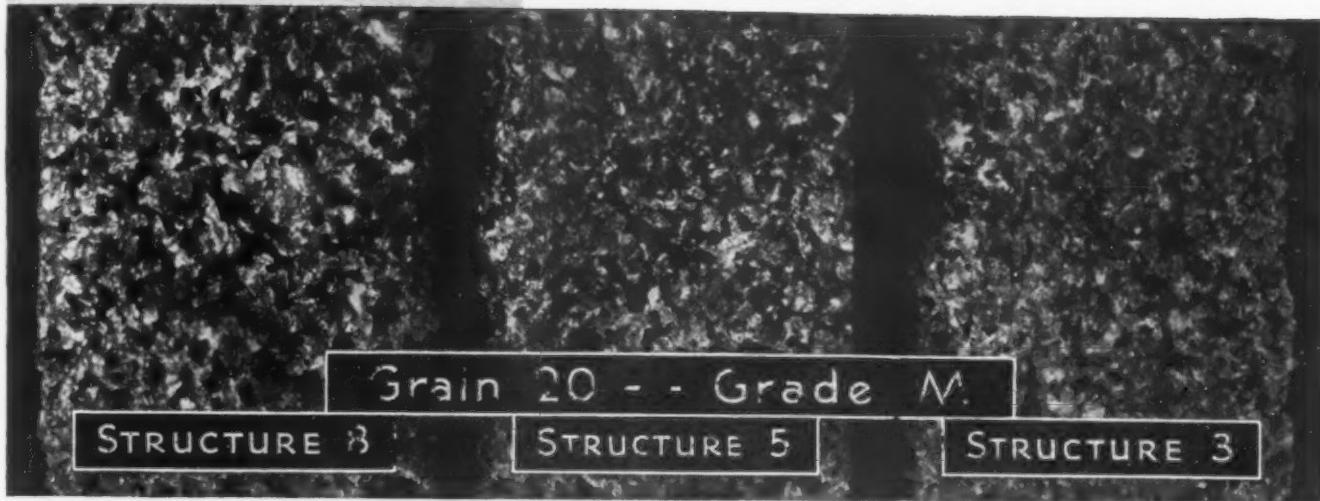
**E. C. ATKINS & CO., Indianapolis, Ind.**

**FOR CUTTING METAL  
USE DISSTON SAWS**

A style and size for every need. Sectional Circular Saws and High Speed Steel Interlocked and Solid Hack Saw Blades.

**HENRY DISSTON & SONS, Inc., Philadelphia, U. S. A.**

# NORTON CONTROLLED STRUCTURE-



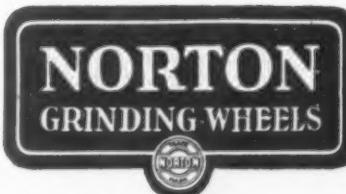
An actual photograph (enlarged) of three wheels identical in grain and grade but different in structure and in grinding action

**T**HE exacting requirements of high production, high precision grinding can now be met more closely than ever before.

The selected wheel of the right grinding action can be precisely duplicated at any and all times.

Thus Norton Controlled Structure is an important step in grinding progress. It means that the fifth characteristic of the wheel is now controlled as definitely and accurately as the other four — kind and size of abrasive, kind and strength of bond.

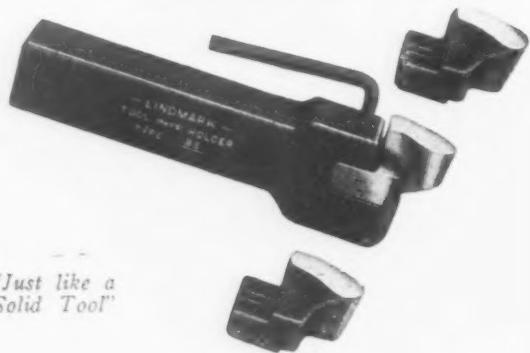
**Complete Control  
of All Five  
Characteristics of  
a Grinding Wheel**



**NORTON COMPANY, WORCESTER, MASS.**

New York      Chicago      Detroit      Philadelphia      Pittsburgh      Hartford  
Cleveland      Syracuse      Hamilton, Ont.      London      Paris      Wesseling, Germany

**LINDMARK**  
the  
**PRODUCTION**  
**HOLDER**



"Just like a  
Solid Tool"

**Suitable for Boring Mills,  
Planers and Heavy Duty Lathes**

The holder supports the bit as near the cutting edge as possible, taking practically all of the strain.

"Stellite" bits are cast for exclusive use with LINDMARK Tool Holders—the Tool Bits are interchangeable.

**THE APEX TOOL COMPANY, INC.**

50 Remer St., Bridgeport, Conn.

QUALITY COLLETS  
AT MASS PRODUC-  
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RIVETT  
LATHE &  
GRINDER CORP.

*Rivett*  
**COLLET CHUCKS**  
Send for special collet booklet

SIZES FITTING LEAD-  
ING MAKES  
OF BENCH  
LATHE  
AND  
ENGINE  
LATHE

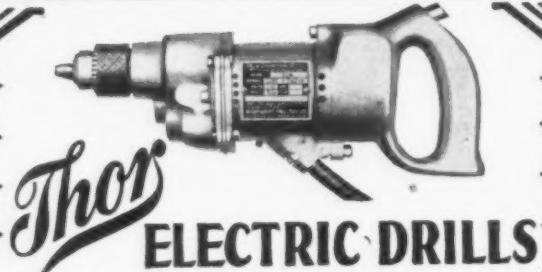
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**"LOGAN" Non-Rotating Air Cylinders**



One of many air operated devices de-  
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LOG S-25. Air Valves, Chucks, Arbor  
Presses, Ejecting and Reducing Valves,  
Special Devices. Send for your copy.

**THE LOGANSPORT MACHINE CO.**  
Logansport Indiana



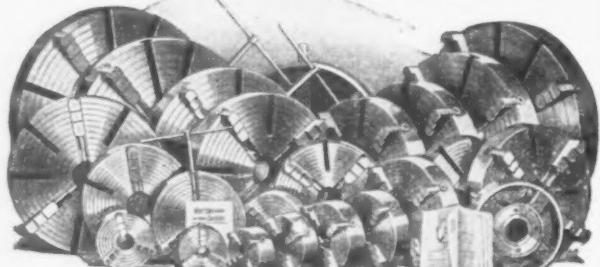
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**ELECTRIC DRILLS**

Built throughout of rugged, easy-running parts. Have the famous *Thor* Superpower motors. Designed to withstand hard, continuous service day after day, month after month, for years. Made in all sizes and types for every need, for alternating, direct, and high frequency alternating currents. Write for catalog.

**Independent Pneumatic Tool Co.**  
616 W. Jackson Blvd., Chicago



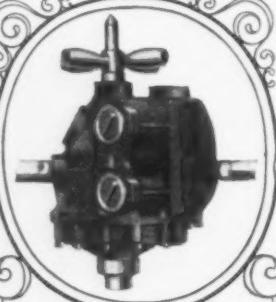
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Complete lines of Independent, Universal and Combination Chucks  
Lathe and Drill Chucks

**THE D. E. WHITON MACHINE CO.**  
New London 286 Howard St. Connecticut

**CLECO**



The New  
**CLECO**  
Ball Bearing  
AIR DRILL

**BALL BEARING AIR DRILLS**  
Reversible and Non-Reversible for Drilling Reaming Tapping Flue Rolling and Wood Boring

Cleco Drills are very simple in their construction. Every revolving part being mounted upon Ball Bearings permits high operating speed with minimum friction. Crank—Connecting Rods, Valves, Pistons, and Gears are all open in the crank chamber and constantly travel in a continuous bath of good lubricant, insuring long life. Write for catalog No. 30 which fully describes the line.

**The Cleveland Pneumatic Tool Co.**  
3734 E. 78th St., Cleveland, O., U. S. A.

Agents for British Isles  
John Macdonald & Co. (Pneumatic Tools), Ltd.  
Glasgow, Scotland.



October 2, 1930

THE IRON AGE

67

## HEATPROOF Compression Riveter DIES



These dies are made from our special heat-proof, heat-resisting steel.

They can be used continuously without cooling and will outlast four or more carbon steel dies.

*Shipped  
on approval*

Send us your specifications.

**GEO. F. MARCHANT  
COMPANY**

1422 So. Rockwell St., Chicago

**HELWIG'S Patent Bolt and Wire Clippers**

**HELWIG MFG. CO.  
St. Paul, Minn.**

**18 IN.**

Convenient, Sturdy, of Few Parts. Cut with Ease, Close to Work, leaving a Neat Job. Knives cannot wabble. Capacities from  $\frac{1}{8}$ " to zero. Also HELWIG Pneumatic and other Hand-operated Time- and Labor-saving Tools having Unique Advantages.

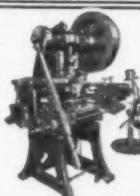
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HOLES  
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( ALL KINDS, SIZES )  
AND STANDARDS  
SEND FOR FREE SAMPLE  
**I. P. RICHARDS CO.**  
23 Pemberton St., Providence, R. I.  
Punches and Dies Since 1868



**Robinson Sheet Metal Working Machinery**  
Inclinable Presses      Gap Presses  
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**NEW ALBANY MACHINE MFG. CO.**  
Sole Owners J. M. Robinson Mfg. Co.  
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You Can Have 50,000 to 100,000 Pieces Per Day, with Press Speeds of 125 to 250 R.P.M. By Equipping with Littell Roll Feeds. For Feeds Write

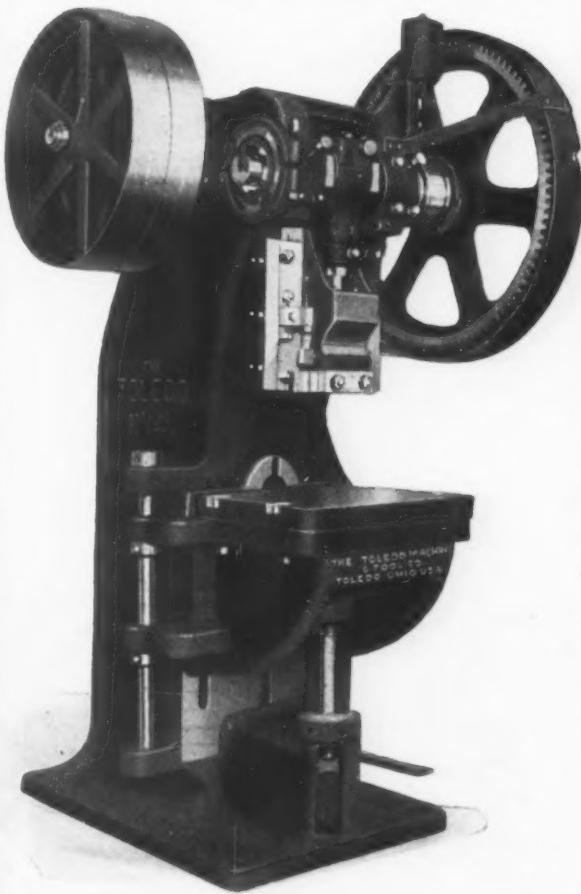
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THE

# "Toledo"

*Side Wheel Type*

HORNING and WIRING PRESSES



INDISPENSABLE for blanking, forming, horning and wiring operations in manufacturing of pieced tin and stamped ware, and sheet metal work. Built in 15 sizes, weighing from 1,500 to 35,000 pounds. Special bolsters, horns, forces and other devices may be attached.

### PRESSES FOR EVERY PURPOSE

*Over two thousand patterns from which to choose.*

### THE TOLEDO MACHINE & TOOL CO.

Engineers, Founders and Machinists on  
Equipment for Sheet Metal Products

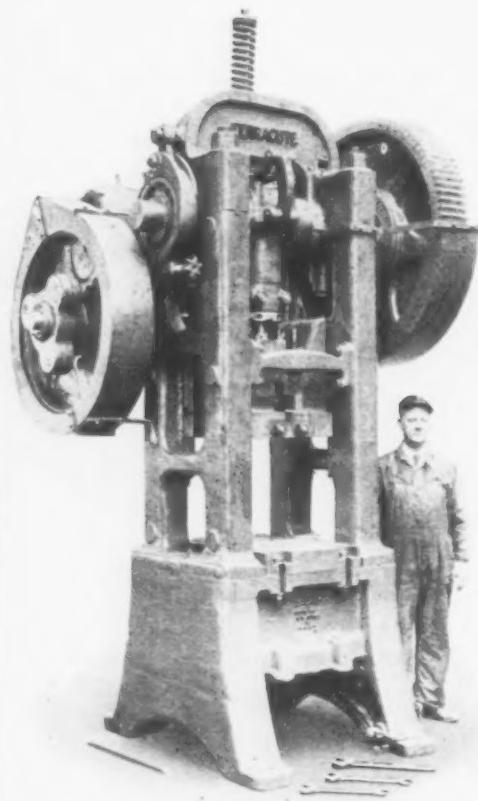
**TOLEDO, OHIO, U. S. A.**

CHICAGO OFFICE  
549 W. Washington Blvd.

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2-258 General Motors Bldg.

# FERRACUTE PRESSES

## For METAL STAMPINGS



A tie-rod press that exerts 100 tons pressure—the press shown in the accompanying cut. It is a sturdy, dependable machine which operates with great economy. Equipped with direct motor drive, ram balance, ram knock-out, ram clamp, shearing pin, jaw clutch, and sheet metal guards.

We can show you a cheaper and vastly better method of producing parts from sheet metal and dies. Ferracute Presses are made in many sizes and styles, a correct machine for every class of service.

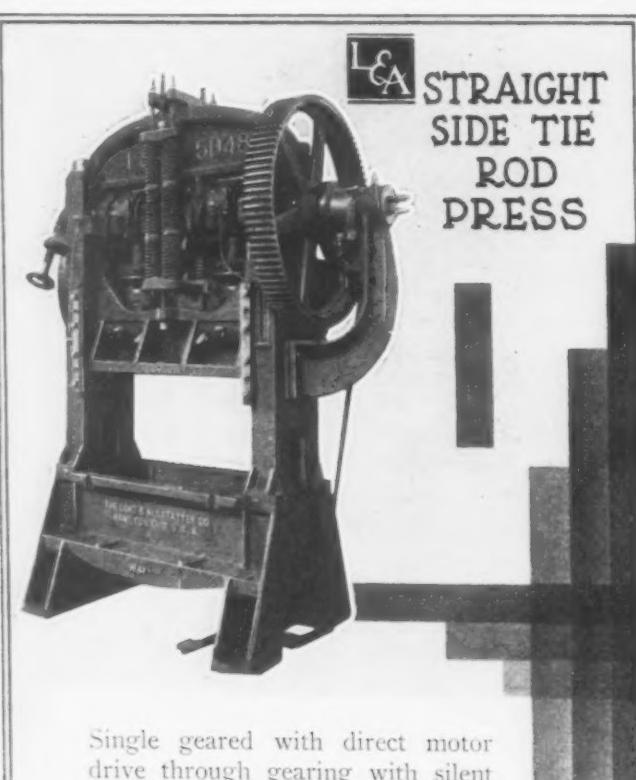
*We welcome inquiries*

# FERRACUTE MACHINE CO.

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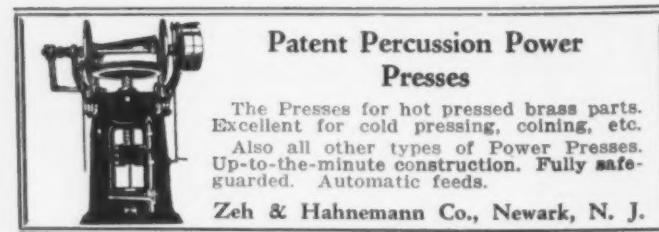
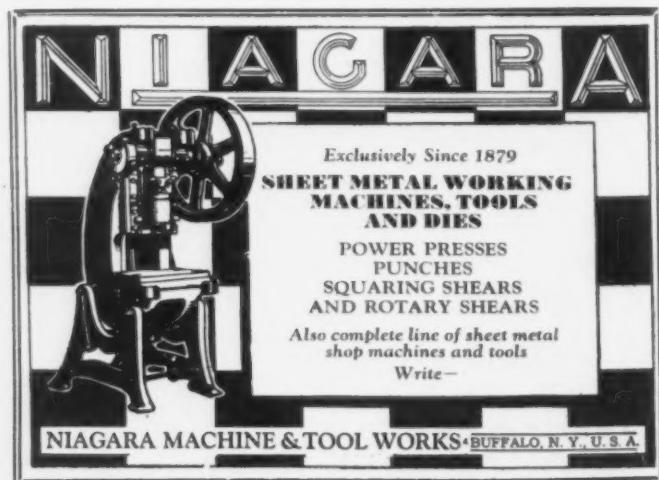
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Single geared with direct motor drive through gearing with silent motor pinion. Self-adjusting brake. Clutch made of .75 carbon steel—four striking surfaces.

The LONG & ALLSTATTER CO.  
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## MINSTER POWER PRESSES

**Inclinable, Horning, Straight Side,  
Punching, Gap, Knuckle Joint and  
Screw Presses**

**THE MINSTER MACHINE CO.**  
Minster, Ohio. U. S. A.

# ANNOUNCING MARQUETTE **4 POINT SUSPENSION PRESS**

(PATENTED)

Power is supplied to the slide directly and simultaneously to the four corners instead of through the center line.

- eliminating all side thrust and bending strains developed by the power application principle of ordinary presses
- bringing the slide down with faces precisely parallel to bed of press
- whether the die strains are off center or not
- and keeping the face of the slide parallel with the bed.

Eliminates shearing of dies.

Makes possible more accurate work.  
Lowers die maintenance and repair costs.

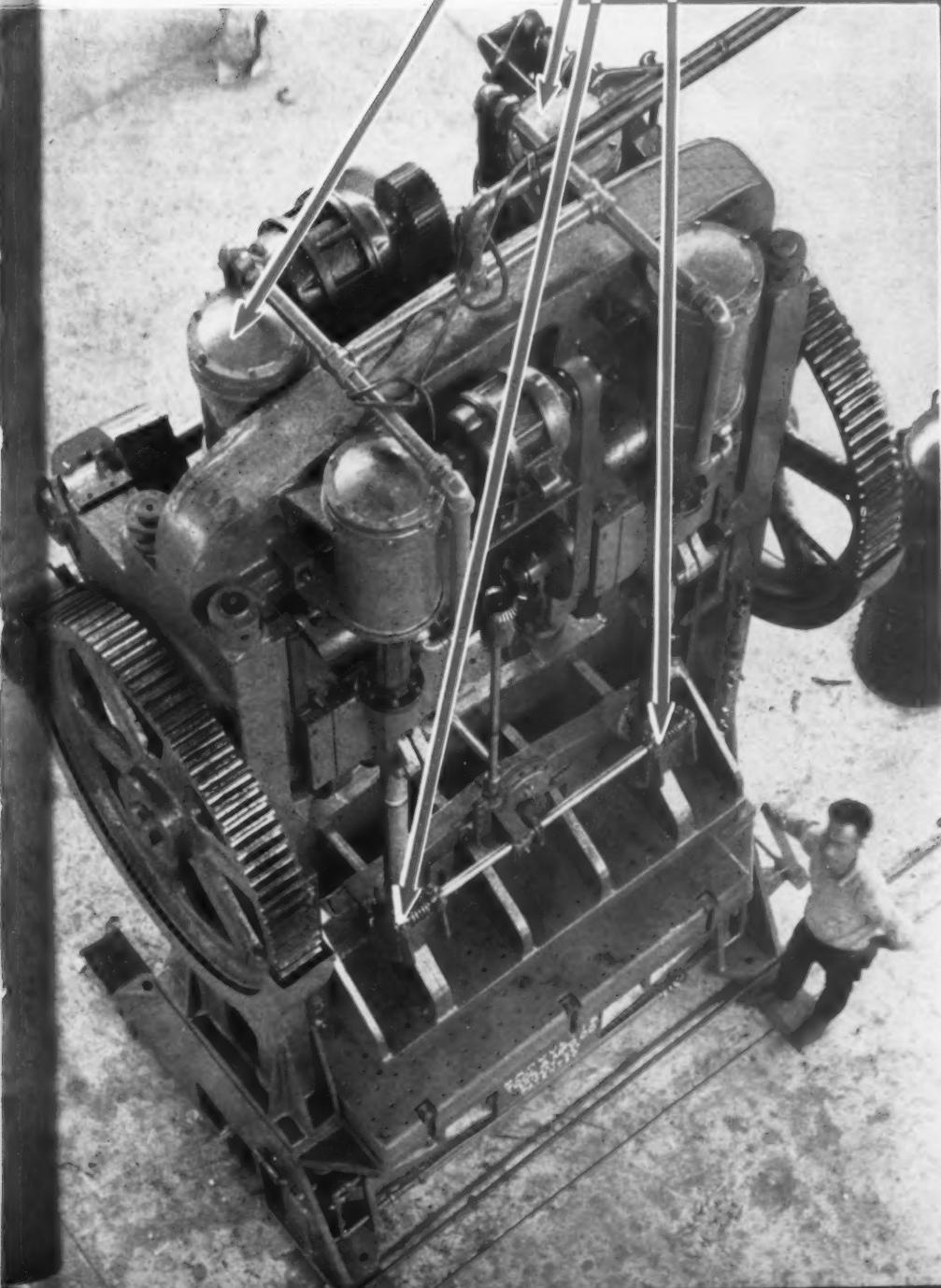
Also can have air cushion blank-holder built in, eliminating need for digging foundation pits, simplifying pipe connections.

Making a complete, self-contained unit, easy to move about the shop if desired.

Write for engineering data and information

**MARQUETTE  
TOOL & MFG. CO.**

6487 W. 65th Street  
CHICAGO, ILL.



*See other side  
for Important Announcement*

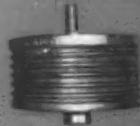
## NO MERE IMPROVEMENTS OF MINOR PARTS

**Marquette developments are fundamental in their nature, bettering methods of handling work, discarding old forms of machine design.**

*Consider the Contributions to Stamping Technique by this One Firm—*



The Cushioned Press Bed



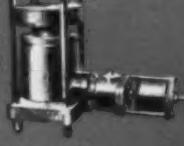
The Air Cushion



Riveting Machine



Die Testing Equipment



Hydro-Pneumatic Die Cushion



Single Cushioned Press Bed

### THE AIR CUSHION

—that device which made it possible for the first time to apply a firm, even, easily and accurately regulated pressure to the blank to the full extent of the draw. Rendered springs and rubber bumper blank holders obsolete—largely eliminated spoilage.

### CUSHIONED PRESS BED

—makes digging pits for press foundations unnecessary, does away with auxiliary pressure tank, requires but one pipe connection, makes it a simple and inexpensive matter to pick up presses and move them about the shop in accordance with changing requirements of production system. These beds can be built to fit any standard size and type of press, or are easily adapted to presses now in use.

### MARQUETTE RIVETING MACHINE

—the outstanding feature of which is that it automatically makes allowances for variations in thickness

of parts fed to it, thereby preventing smashed rivets and strains to the press where parts are oversize, preventing loose riveting where parts are undersize. Safe as a hydraulic, fast as a mechanical press.

### THE HYDRO-PNEUMATIC CUSHION

—makes it possible to handle tremendously large working pressures in small space, with flexibility to handle small, light work on the same equipment with no time loss for change over, as far as blank holding means is concerned.

### THE PNEUMATIC DIE TESTING MACHINE

—which makes it possible to run through the tryouts on dies in a fraction of the time formerly required, and to lift them over to the job press 90% perfect instead of only 50 or 60% needing further adjustment and trial, as has been common practice heretofore. Furthermore, the pressure is accurately determinable in advance.

*—and now POWER PRESSES with 4 POINT suspension and air-cushion blank holders built in*

(See other side of this page for description.) This is the first 4 point suspension press ever built. Its basic principle—that of preventing in a mechanically positive manner the tendency of the slide and ram to tip, by suspending the ram from four points—was originated by Marquette engineers.

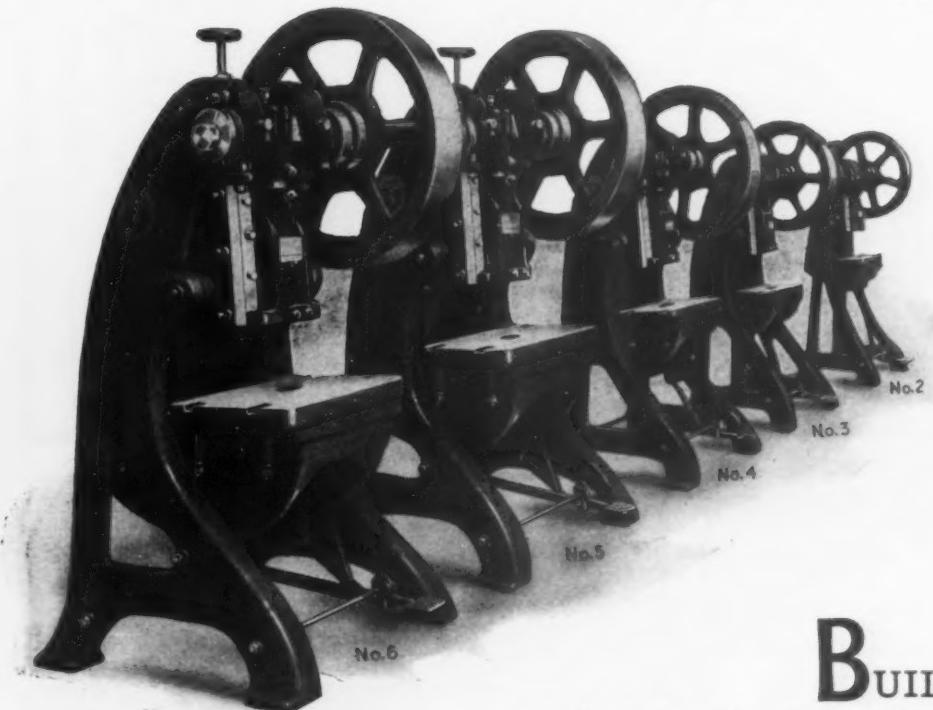
*Come to MARQUETTE with your metal stamping and drawing problems.*

**MARQUETTE TOOL & MFG. CO.**

6487 West 65th Street, Chicago, Illinois

# "ADRANCE"

## INCLINABLE OPEN BACK POWER PRESSES WITH FRONT ADJUSTMENT



Pacific Coast Representatives:  
C. F. BULOTTI MACHINERY CO.  
829 Polson St., San Francisco, Cal.

WESTERN MACHINERY EXCHANGE  
Santa Fe Ave. at 9th St.  
Los Angeles, Cal.

BUCK & HICKMAN, LTD.  
2 Whitechapel Road, London  
Sole Agents for Great Britain

We manufacture:

- Inclinable Presses
- Straight Side Presses
- Square Double Seagers
- Round Double Seagers
- Automatic Feed Presses
- Horning and Wiring Presses
- Double Action Presses
- Double Crank Presses
- Drawing Presses
- Automatic Screw Rolling Machines
- Punching Presses
- Arch Type Presses
- Slitters and Shears
- Can Making Machinery
- Spinning Lathes
- Power Squeezers
- Crown Cap Making Equipment
- Dies and Tools
- for Working Sheet Metal

BUILT in five sizes in geared and flywheel types. Their flexibility of operation with dies upon sheet-metal has commended them to the trade as the most practical of all-purpose power presses. "Adriance" Automatic Feeds may be attached to these presses, making complete automatic units for the increased efficiency required in modern mass production.



ADRIANCE MACHINE WORKS, INCORPORATED

82 RICHARDS STREET

BROOKLYN, N. Y.

Please send copy of Bulletin No. 1, illustrating and describing "Adriance" Inclinable Open Back Power Presses.

Please send information regarding.....

Name .....

Address .....

**THIS  
HIGH SPEED PIPE FITTING TESTING MACHINE  
Will Test 100% of your Production with air under  
water, guaranteeing**

**FIRST—Safety.**

**SECOND—Defective castings scrapped  
before production starts.**

**THIRD—No tearing down time in  
installation costs.**

**FOURTH—Satisfied customers.**

The machine illustrated will test fittings cheaply, easily and quickly. All fittings, 90° and 45° Elbows, Street Elbows, Tees, Crosses and Return Bends in sizes up to 1½" can be tested in one machine at an air pressure of 50 lb. per square inch under water with 90 lb. operating pressure. The fittings can be tested either before or after tapping. Quantities of 500 to 600 can be tested per hour.

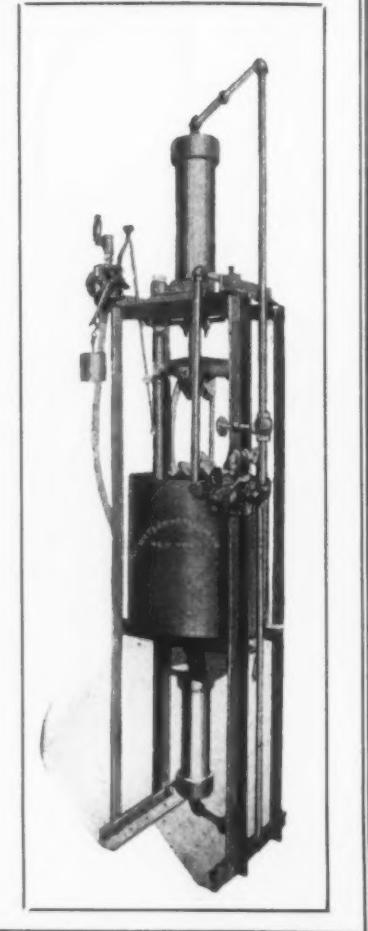
WRITE FOR DETAILS

**THE WATSON-STILLMAN CO.  
71 WEST ST., NEW YORK**

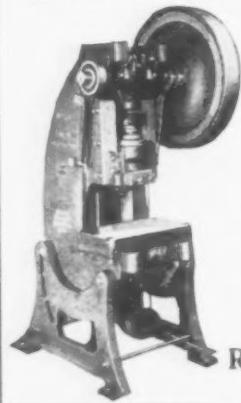
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**THE SPIRIT OF THE TIMES**



is reflected in the speed  
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Rockford" Presses.

They are built to produce  
and maintain High Pro-  
duction and they do it.

Wide range of sizes and  
types.

Write today for new cata-  
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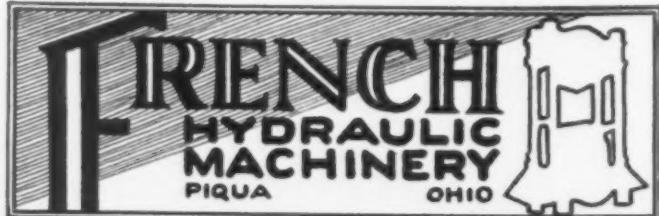
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JACKS, CAR PROPELLERS, PUMPS, PRESSES, PUNCHES  
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ESTABLISHED 1840

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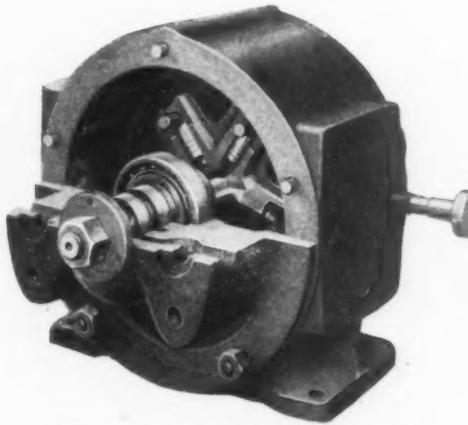
DESIGNERS AND BUILDERS OF  
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and Valves  
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Birdsboro Rolls  
Birdsboro 30 Castings  
Be sure to note full page ad in this week's "Iron Trade Review"

# Hydraulic Smoothness with the HELE-SHAW



Cut away view of High Pressure Hele-Shaw Hydraulic Pump

SURELY, steadily, quietly, with liquid smoothness, Hele-Shaw Hydraulic Pumps go about their work, providing easily controllable power for drives of all kinds.

Without effort, they build up pressure to overcome resistance that would cause gearing to clash and grind, but they do it under such perfect control that no excess pressure ever can be applied to break tools or machines.

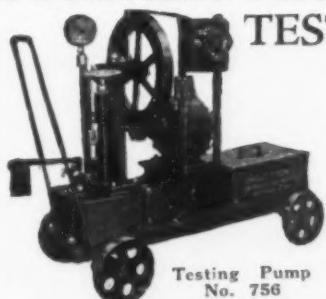
The Hele-Shaw Pump operates on a principle of balance. Pressure in the fluid system, automatically controlled, invariably balances the resistance to be overcome up to the limit of the pump's capacity. As a result, operation is continuous, without pulsation, and the Hele-Shaw pump runs at a constant speed, regardless of the pressure or speed at which the machine it drives is operated.

Write for booklet describing the many uses of Hele-Shaw Pumps.

**AMERICAN FLUID MOTORS COMPANY**  
2410 Aramingo Avenue

Philadelphia, Pa.

## PORTABLE HIGH PRESSURE TESTING PUMPS



Testing Pump  
No. 756

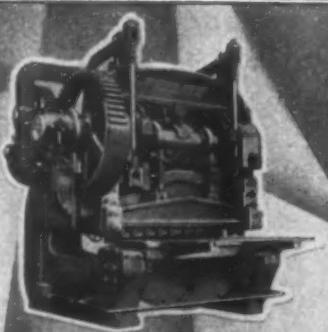
### Hand Belt or Motor Driven

Built for the MOST SEVERE SERVICE, with forged steel pressure cylinders, renewable valves and seats and bronze fitted throughout.

CHARLES F. ELMES ENGINEERING WORKS  
1003 - 1011 FULTON ST. HYDRAULIC MACHINERY SINCE 1873 ELMES CHICAGO U.S.A.

### Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work.



HEAVY GATE SHEAR.  
Capacity 6' x 1 1/4" plate - 36" gap

**BERTSCH & CO.**  
Cambridge City, Indiana

**JOHN ROBERTSON CO.**  
HYDRAULIC PRESSES and PUMPS

Extrusion Presses Platen Presses Hydraulic Pressure Pumps  
Lead Encasing Presses Moulding Presses and Special Machinery  
See our advertisement in the second issue, each month.

123 WATER ST BROOKLYN, N.Y.

## MILWAUKEE ALLIGATOR SHEARS

Milwaukee ALL STEEL Shears will cut out and outlast any other alligator shear. They are made by BUILDERS OF ALLIGATOR SHEARS ONLY—FOR 30 YEARS.

**DOELGER & KIRSTEN**  
3105 Chambers Street, Milwaukee, Wis.



SHEARS-PUNCHES  
HEAVY PRESSES  
UNBREAKABLE  
STEEL PLATE  
FRAMES



HENRY PELS  
& CO., Inc.  
90 West St., New York

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Straighteners & Levelers  
Mill Tables  
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Fabricated Plate Work

140 WASHINGTON ST.  
NORRISTOWN, PENNSYLVANIA  
NEW YORK CITY  
400 UNION TRUST BLDG.  
PITTSBURGH, PA.

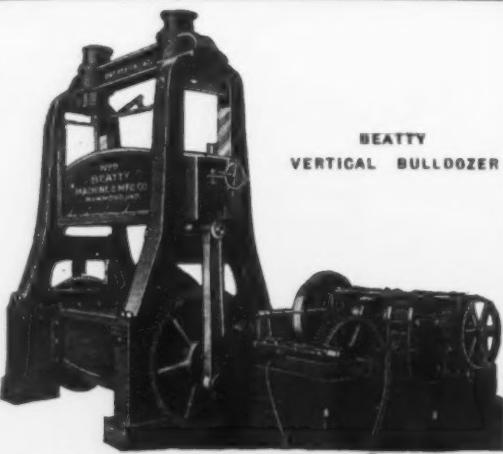
## The Beatty Vertical Bulldozer

This Beatty Machine gives the greatest possible clear working space, with ample die-room for two or more set-ups. All parts are well proportioned to give strength and rigidity. The ram is counterbalanced, and the double friction clutch gives an immediate stop and reversal at any point.

*Write for our new literature  
covering complete line of Vertical Bulldozers.*

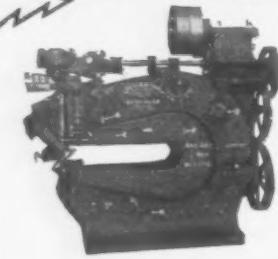
BEATTY MACHINE & MFG. CO.

150th and Oak Street  
HAMMOND, IND.



BEATTY  
VERTICAL BULLDOZER

## QUICKWORK



### ROTARY SHEARS

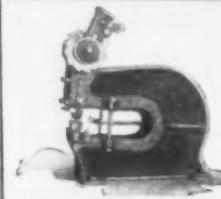
Cut square and beveled edges in straight or irregular shapes, cut and flange circles, joggle, etc. One "QUICKWORK" replaces several old standard machines and does work they will not do. Made in many sizes for all gauges up to 1".

*Write for Catalog No. 90*

THE QUICKWORK COMPANY  
(NOT INCORPORATED—H. COLLIER SMITH, OWNER)

ST. MARY'S, OHIO, U. S. A.

Cable Address: "QUICKWORK." All standard codes used.



### BELOIT LEVER PUNCH

Designed for the heaviest work. Quickly changed to work with or without ratchet. 4" to 15" throat. Will punch  $\frac{1}{2}$ " hole through  $\frac{3}{4}$ " iron or equivalent. Get our complete catalog.

HENDLEY and WHITTEMORE CO.  
Blackhawk Blvd., Beloit, Wisconsin

## KANE & ROACH

STRAIGHTENING ROLLS  
BENDING ROLLS  
COLD ROLL FORMING MACHINERY  
SPECIAL MACHINERY



Syracuse, N. Y.

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Unbreakable Steel  
Plate Frame

Punching  
and Shearing  
Machines

... cut costs,  
boost profits

Bending Machines  
for rolling  
Angles, Beams,  
Channels, etc.

... famous for  
accurate work

David H. Smith & Sons, Inc.

Representatives in All Principal Cities of U. S. A. and Canada  
Foot of 51st St. . . . . Brooklyn, N. Y.

HAND BRAKES  
POWER BRAKES  
PRESS BRAKES

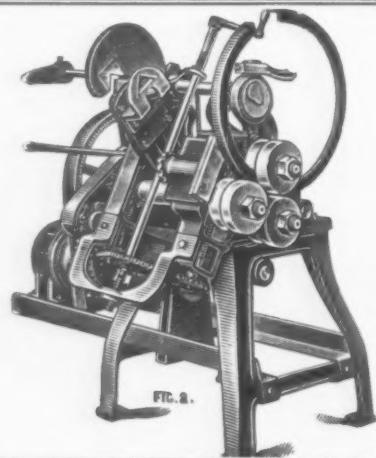
### POWER SQUARING SHEARS

COMPLETE LINE OF SHEET AND PLATE  
BENDING AND SHEARING MACHINES FOR  
LIGHT SHEETS OR PLATES UP TO  $\frac{1}{4}$ " THICK.

OVER 30,000 USERS  
WRITE FOR LITERATURE

## DREIS & KRUMP MFG. CO.

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### CIRCULAR ANGLE

### BENDING MACHINE No. 14

*Capacity up to 2 in. Angle Iron 10 in. to 10 ft. circles  
With or without cut-off attachment; belt or motor driven.*

True circles can be formed on this Machine free from twist.  
We are designing a Machine to bend into circles, U or S shape, 4" x 4" angle iron or  
under.

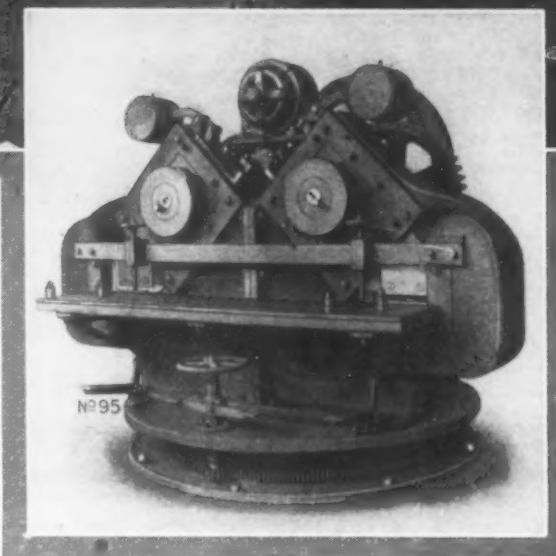
Your inquiries solicited.

Also manufacturers of Automatic Grinding and Polishing Machines, Crushers,  
Pulverizers, Power Shears, Presses, Punches, Brakes, etc.

*Write for Descriptive Circulars*

EXCELSIOR TOOL & MACHINE CO.  
EAST ST. LOUIS, ILL.

## "CAPTAINS IN THE PARADE OF PROGRESS"



**J**OHN A. ROEBLING, the master builder of bridges, believed in an ideal; fought for an ideal and died when that ideal was partially realized. After the successful completion of his Niagara Bridge Roebling pressed his plans to span the East River with a suspension bridge. His battle with the skeptics, the unbelievers and the politicians for approval of his plans is an epic in itself. But at last he received the coveted contract and the Herculean construction task was commenced. He was without engineering precedent; his men had to be personally trained and his machinery for the spinning of the cables and the fabrication of the steel was woefully primitive. His health broke under the great strain and he died. But the groundwork had been laid and his son was able to carry the work to a successful end in 1883.

The Brooklyn Bridge was over ten years in the making. Today a modern bridge of the same or even greater size is built in less than half the time. Great progress has been made, not alone in construction methods, but also in machinery for the fabrication of the steel. Today fabricators using Thomas Machinery are establishing records in structural steel construction that not even Roebling, advanced thinker though he was, would have dared to predict.

**T**HE Thomas Angle Shear may be depended upon to give accurate, economical production on any angle cutting job. It is designed for square or mitre shearing of any angle up to 45 degrees. Details of construction and performance are available in Bulletin number A113. Write for it.

# THOMAS

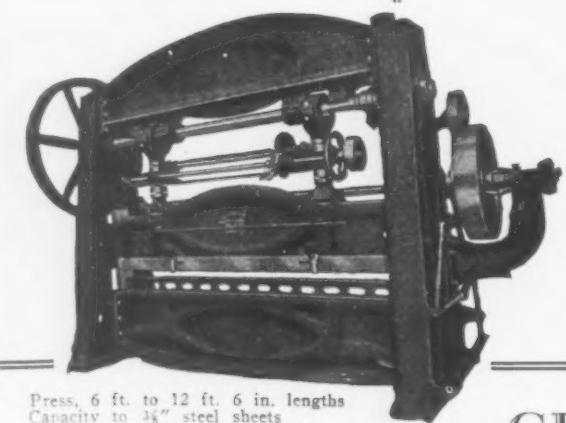
SPACING MACHINE COMPANY

CHICAGO

PITTSBURGH

PHILADELPHIA

# HERE'S What you can do on this OHL-10 Ft. Power Brake



Press, 6 ft. to 12 ft. 6 in. lengths  
Capacity to  $\frac{3}{8}$ " steel sheets

—Bend a ten-foot sheet of No. 10 gauge steel—or, form skylight bars of No. 26 gauge steel in two operations. The seven members are bent in one operation and the bar squeezed together in the next.

This OHL Power Brake is equipped with a new method of holding dies, is amply proportioned, and heavily constructed, and includes a patented friction gear.

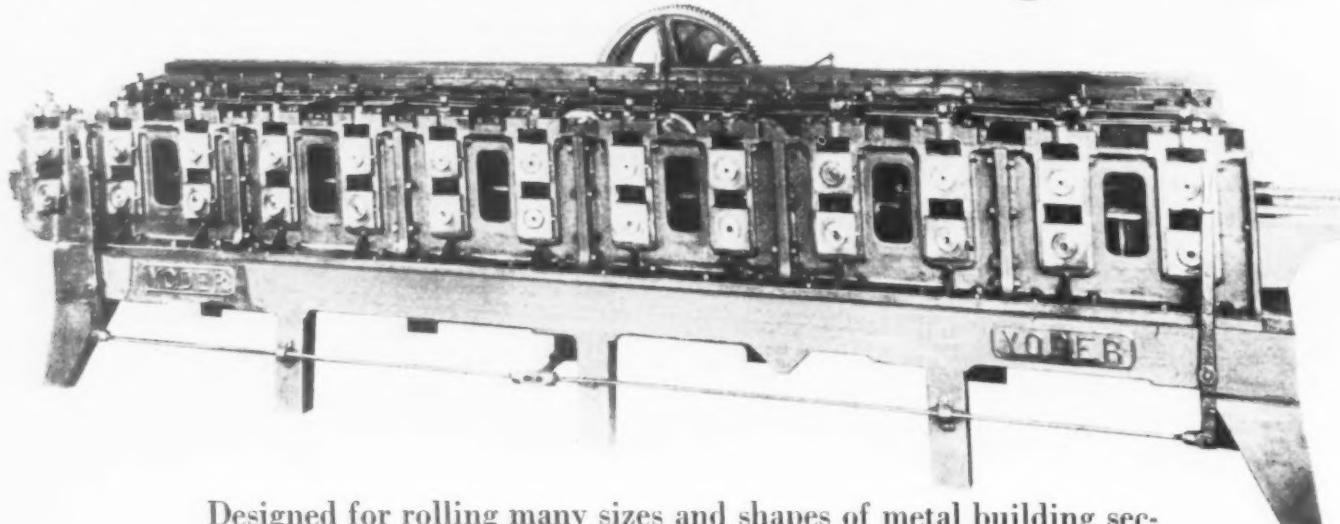
We'll be glad to go over this machine with you point for point and explain how economical—and simple—it is to operate.

**GEORGE A. OHL & CO., Inc.**  
*Originators of Sheet Metal Working Machinery Since 1863*  
**151-161 Oraton St.** Newark, N. J.

*Crimping and Hammering Machines — Slitting Shears—Power Presses.*

*Double Cam Brakes—Slip Roll Formers—Squaring Shears—Mitre Cutters—*

## Yoder H 1335 Cold Roll Forming Machine

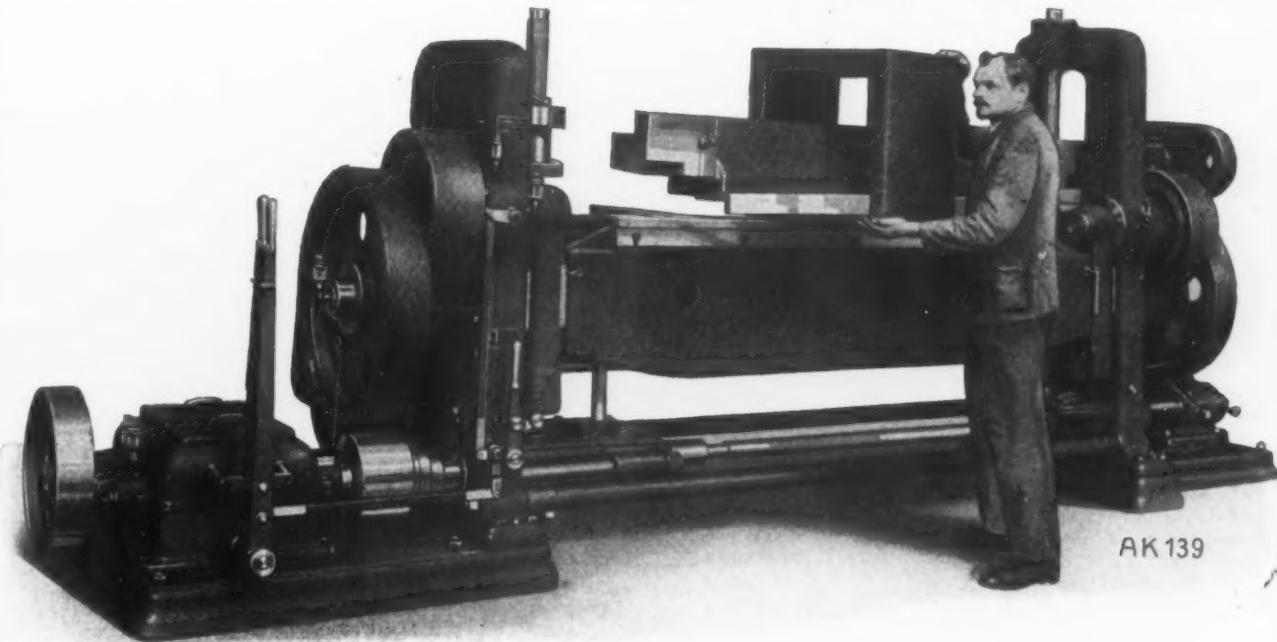


Designed for rolling many sizes and shapes of metal building sections; metal trim, moldings, roofing sheets, flooring plates, casings, heavy tubing, and similar sections at 80' to 100' per minute.

*Send drawings for estimate*

**THE YODER COMPANY, CLEVELAND, OHIO**

55TH STREET AND WALWORTH AVE.



**Schatz Universal Brake Folding, Rounding and Box-Forming Machine with  
Swing-out Top Bar**

*The Most Unique Plate Bending Machine Available*

Made in various widths for various plate thicknesses, and for hand or power operation

For instance: a 10' x  $\frac{3}{8}$ " machine has some of the following characteristics—

- An Upward Adjustment of the Top Clamping Bar of  $18\frac{3}{4}$ "
- A Downward Adjustment of the Bottom Clamping Bar of 8"
- An Outward Adjustment of the Folding Bar of 8"
- Bends any Radius up to 8" in one sweep of the Folding Bar
- Forms Tubes, Straight or Tapered, up to 16" Diameter
- Makes Boxes or Tanks from One Sheet of Material over the Top Clamping Bar, which has a cross section of 14" x  $15\frac{1}{4}$ "
- Such Boxes can have inside or outside flanges at either or both ends.
- Can make Smaller Rectangular Forms over special bar inserted between Top and Bottom Clamping Bars
- Can use High Angle Forming Blade for bending Trays, etc., with Walls up to 15" High.
- Bends are made Accurately, in a Straight Line, up to Maximum Capacity and during the long life of the Machine
- No Loosening of Screws to change Blades in Top Clamping Bar

*Ask for Illustrated Form 129*

**THE SCHATZ MANUFACTURING CO.**  
**POUGHKEEPSIE, N.Y.**  
**"UNUSUAL MACHINE TOOLS"**

**"Stamco" Sheet & Plate Machinery**

NOTE—We have incorporated here the same Caterpillar Conveyor as used on our Continuous Sheet Pack Shears and which alone will trim and slit sheets WITHOUT CAMBER.

**Caterpillar Holddown Conveyor Rotary Slitter**  
(Patent Applied For)

Especially designed for trimming and slitting long sheets, etc.

**The STREINE TOOL & MFG. CO.**  
NEW BREMEN, OHIO

**Model C**

**THE KARDONG  
CIRCLE (Silent Chain Drive) BENDER**

Circles of any size required in reinforcing work from 18" in diameter up can be made on this bender. Changes of radius can be made in the same circle, without stopping machine with lever adjustment. Where speed and large capacity are required this machine will give unfailing satisfaction. It is the right machine for the fabricator having a heavy tonnage of reinforcing circles. As high as five one-half inch bars can be bent in one operation.

Ask for catalogue of our complete line of reinforcing steel benders.

**KARDONG BROTHERS, Inc.**  
MINNEAPOLIS, MINN.

**1 of 21**

Sizes and Types of Hand and Motor Operated Cold Pipe Bending Machines we make bending  $\frac{1}{4}$ " to 8" Pipe.

Cost of Bending	1" — 2 cents	3" — 20 cents	8" — 80 cents
	2" — 5 cents	4" — 40 cents	8" — \$1.00

Over 8,000 in use. Send for catalog.  
Pipe Threading and Cutting Machines  $\frac{1}{4}$ " to 18".  
**AMERICAN PIPE BENDING MACHINE CO., Inc.**  
31 Pearl Street, Boston, Mass.

**ALLEN RIVETERS**  
VARIOUS TYPES AND SIZES  
FOR ALL RIVETING PURPOSES  
**JOHN F. ALLEN CO.**  
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**HANNA RIVETERS**  
HANNA ENGINEERING WORKS  
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**SWIFT ELECTRIC WELDER Co.**

Manufacturers of BUTT AND SPOT WELDING MACHINES, HAND AND AUTOMATIC  
Office: Boulevard Temple Bldg., W. Grand Blvd. at 12th St., Detroit, Mich.  
Factory: 817 S. Leighton St., Kenton, Ohio.

# Now is the time

*for improvements—  
reclamation—  
repair—*

This is the time, in advance of heavier schedules, to make those improvements in your plant layout, equipment or machinery that your last rush season showed to be desirable.



Also, it would be worth while to inspect that scrap pile and see if there is not a good deal of material that can be economically reclaimed by welding. Many parts that seemed doomed to the "buster" may be profitably put back into service by welding cracks and breaks or building up worn spots or surfaces.

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## AIR REDUCTION SALES COMPANY

Lincoln Bldg., East 42nd Street      NEW YORK CITY

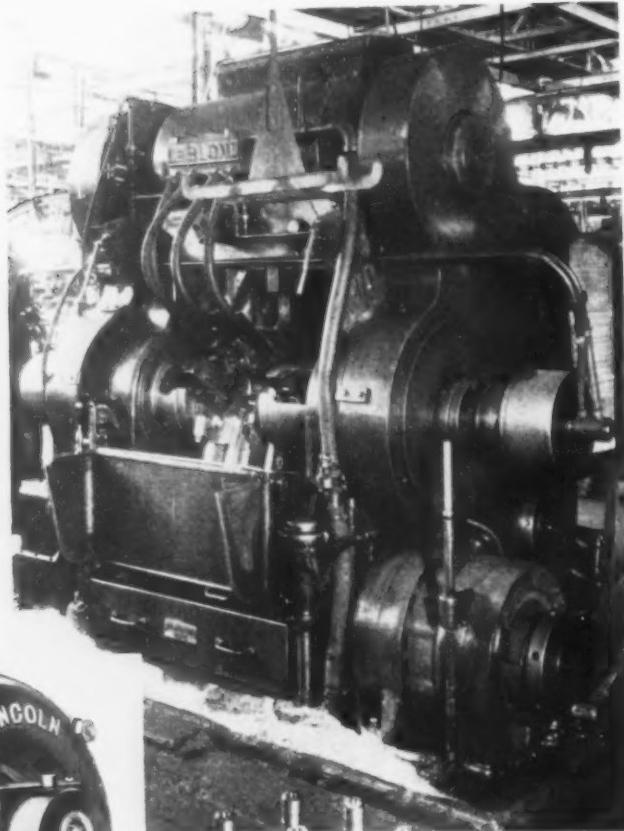
Airco Oxygen—Airco Acetylene—Airco-National Carbide—Airco-Davis-Bournonville Welding and Cutting Apparatus—Supplies

90 Plants

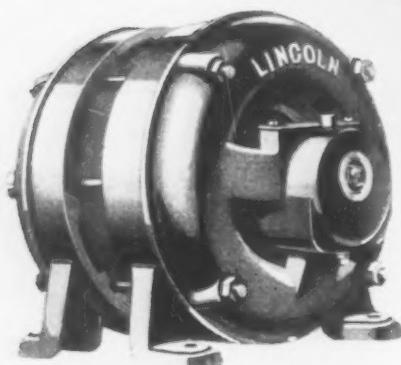
125 Distributing Stations



TRADITION



PROGRESS



"YOU'LL be glad to know that the order has finally been placed for the big new machines. It has taken a long time to decide which make was best for our purpose but now all that remains is the simple matter of ordering some motors to drive them and we'll be all set."

"That's one way of looking at it . . . care on machine selection and don't care on motor choice.

That's the way one motor car builder looked at it until motor shutdowns called his attention to some things.

They tried out a 'Linc-Weld' motor on a Le Blond lathe for turning crank shafts.

Since then there has been no forced shutdowns on this lathe.

For more than a year the 'Linc-Weld' motor has been stopped and started 17 times every working hour . . . and HOW.

When they stop the motor, they STOP it . . . for as soon as the turning operation is completed, the motor is automatically thrown into the reverse direction to stop it.

Did I hear you say 'Magical results'? Not at all. 'Linc-Weld' is built for that service. No magic to it . . . just superior design (on three counts) and superior construction of STEEL."

THE LINCOLN ELECTRIC COMPANY  
DEPARTMENT NO. 19-10, CLEVELAND, OHIO

M-77

# LINCOLN "LINC-WELD" MOTORS

**Federal**

## Announcing to the Metal Industry

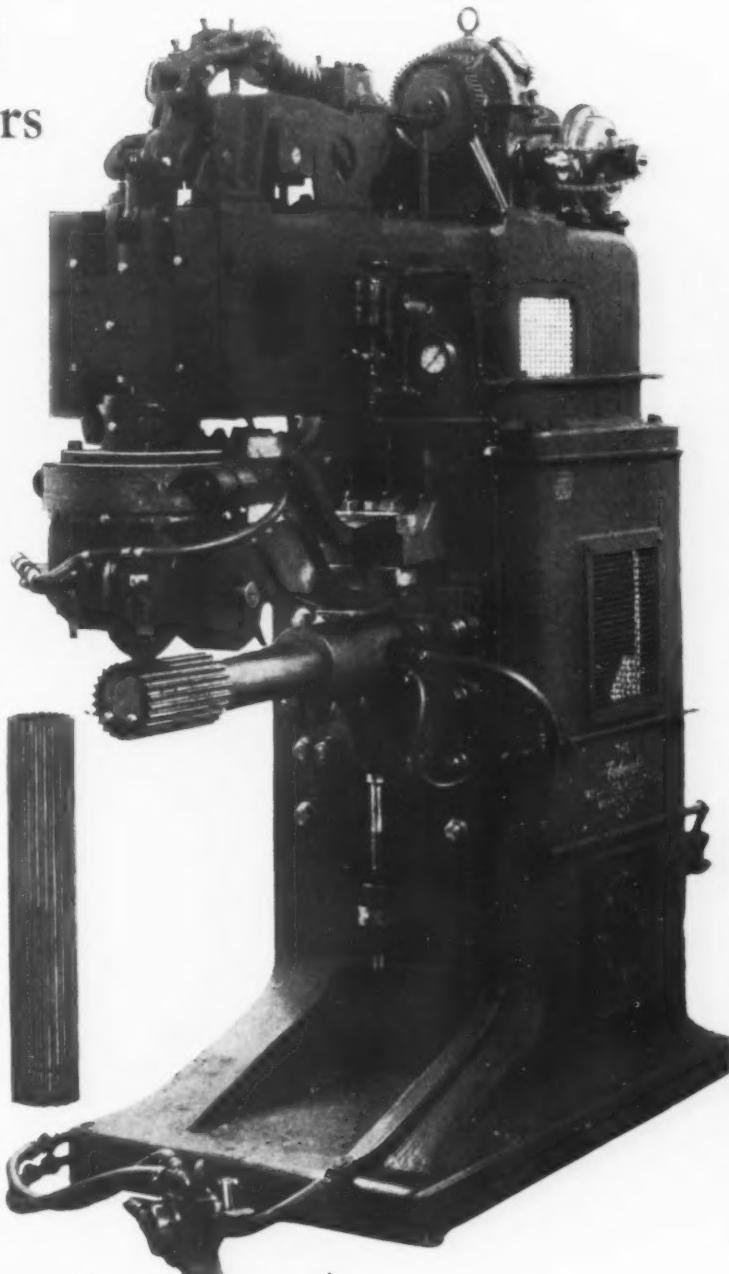
### A Standard Line of Federal Seam Welders

All the experience, the knowledge of Seam Welding requirements, that have gone into the construction of Federal Seam Welders designed for special work, have now been concentrated in the production of the new Federal Line of Standard Model Seam Welders of which this machine is an example.

Unique features such as — pressure supplied by air through a toggle device with easily adjustable and readily accessible spring control; all current carrying parts water cooled; no magnetic material used in or near the welding rolls; either or both rolls can be driven according to the requirements of the work.

The capacity range of this new Federal Line is from 50 to 150 K.W. with 16 points regulation through a separate regulating coil; speeds 10 to 30 feet per minute on 16 to 24 gauge; throat depths from 24" to 48". The machine shown welds inside a 6" corrugated tube.

Send for details of this New Line of Federal Standard Model Seam Welders.



THE

**Federal**

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Los Angeles—Smith Booth Usher Co.  
New York City—50 Church St.  
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Pittsburgh—Rush Machinery Co.  
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Chicago—15 S. Clinton St.  
Cincinnati—303 Hazen Bldg.  
Cleveland—1053 Leader Bldg.

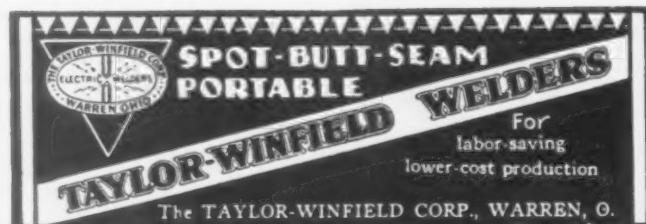
## THOMSON-GIBB WELDERS



SPOT—BUTT—SEAM  
PROJECTION—FLASH  
AND SPECIAL TYPES

We maintain a staff of experienced sales engineers and service men in all important industrial districts.

THOMSON-GIBB ELECTRIC WELDING CO.  
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SPOT-BUTT-SEAM  
PORTABLE

For  
labor-saving  
lower-cost production

The TAYLOR-WINFIELD CORP., WARREN, O.

## AGNEW WELDERS

ELECTRIC SPOT, BUTT & SEAM WELDERS  
STANDARD & SPECIAL

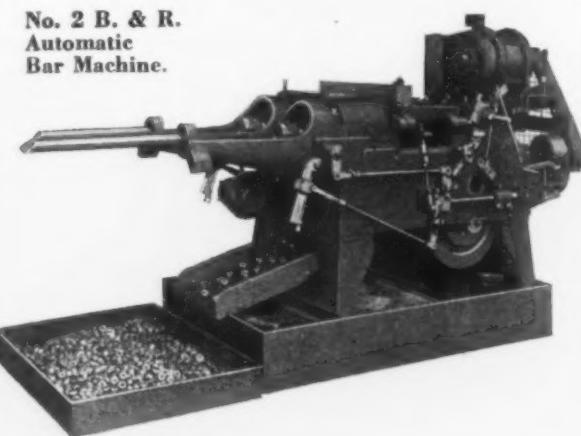
WIRE WELDERS A SPECIALTY

AGNEW ELECTRIC WELDER CO.

Manufacturers of Electric Welding Machines since 1905

MILFORD, MICH.

No. 2 B. & R.  
Automatic  
Bar Machine.



### Profit-Earning Nut-Blank Equipment.

Proven Advantages of B. & R. Automatic Bar Machines  
for Making Nuts

More Nuts from given weight of stock  
used.

Higher Grade of Product.

More Production per spindle per hour.  
Repeat orders verify these claims.

These machines are built in four sizes, covering range of  
nut sizes from  $\frac{1}{4}$ " to 2" U. S. Std. Will handle either cold-  
drawn or hot-rolled bar stock.

### THE BUDD-RANNEY ENGINEERING CO.

119 WEST CHESTNUT ST., COLUMBUS, OHIO, U. S. A.

# MANVILLE

## DESIGNERS and BUILDERS SINCE 1886

Bolt—Nut—Rivet—Carriage & Machine Bolt—  
Cap Screw Machines, Wood Screw Machinery,  
Hot and Cold Ball Machines, Power Presses,  
Wire Formers

### THE E. J. MANVILLE MACHINE CO.

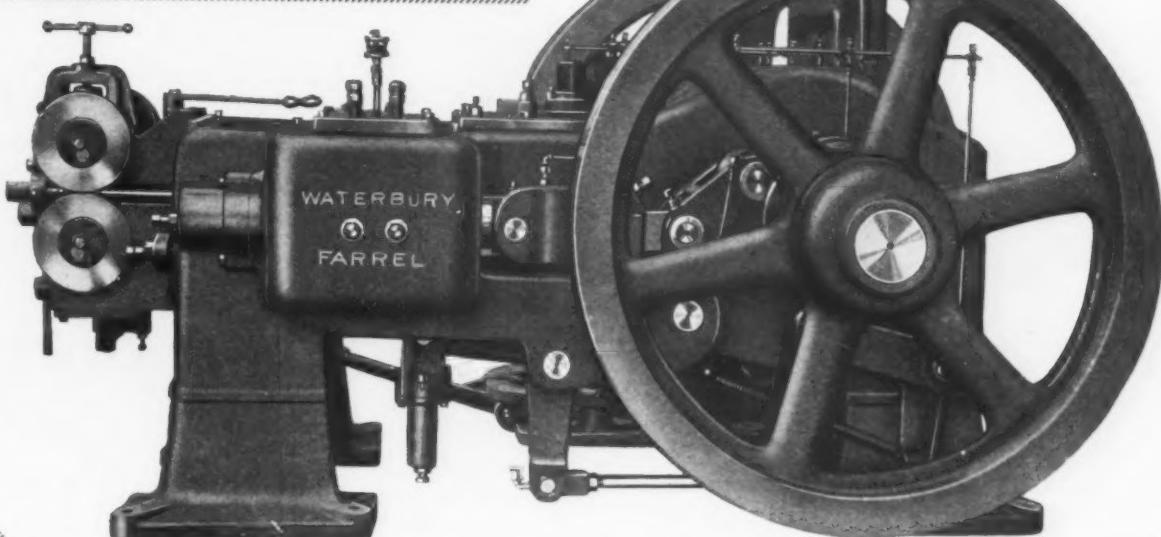
Home Office and Works—Waterbury, Conn., U. S. A.

1209 Swetland Bldg.  
Cleveland, Ohio

Branch Offices

Stephenson Bldg.  
Detroit, Mich.

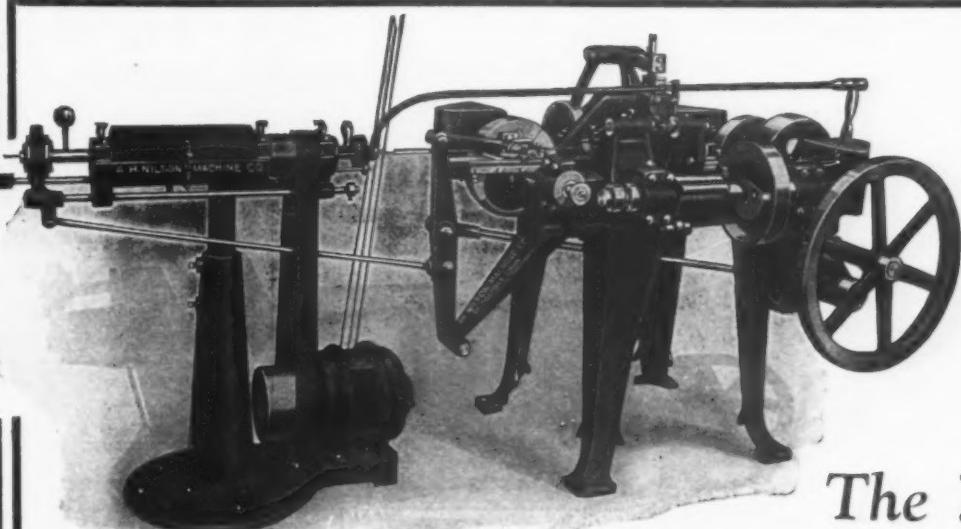
## WATERBURY-FARREL BOLT, SCREW, RIVET AND NUT MACHINERY

*Rivet Headers*

Open Die Single Stroke machines, sizes for  $\frac{1}{8}$ " to  $\frac{7}{8}$ " rivets. The illustration shows the  $\frac{3}{4}$ " size for rivets  $2\frac{1}{2}$ " to 6" long under the head. Production, 80 to 95 per minute depending on the length. Floor space, 94" x 138"; weight 41,000 pounds.

## The Waterbury Farrel Foundry and Machine Company

HOME OFFICE AND WORKS: Bank and Meadow Sts., Waterbury, Connecticut  
WESTERN SALES OFFICE: 736 Bulkley Building, Cleveland, Ohio



## The NILSON

## FOUR SLIDE WIRE FORMING MACHINE

Wire forming machines are generally equipped with the well known, two-way Roll Straightener, but when a more effective straightener is required, or spring wire is to be formed, a Rotary Straightener is the solution.

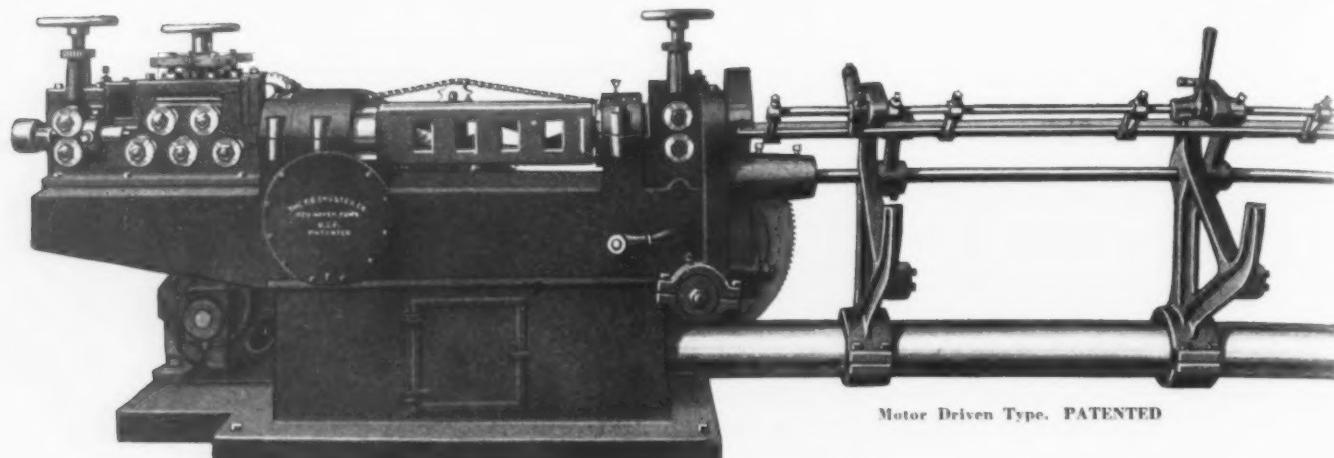
The usual objection to the ordinary overhead counter-shaft driven straightener is that it cannot be started or stopped simultaneously with the forming machine itself.

Another objectionable feature has been eliminated by replacing the unreliable spring controlling the oscillation of the arbor with a positive rod connection to the feed arm of the forming machine.

The maximum capacity of the straightener described herein is No. 7 gauge—minimum No. 12 gauge. By furnishing an extra arbor, all sizes to No. 18 gauge can be straightened on the machine.

The straightener may be ordered with either or both arbors.

THE A. H. NILSON MACHINE COMPANY - - Bridgeport, Conn.



Motor Driven Type. PATENTED

## Wire Straightening Your Problem?

Our experience covers 64 years studying the requirements of the trade, and the best way to meet them, and we can give you valuable assistance in cutting down your production costs. . . . Sturdy Machines which stand up to their work permanently, and pay for themselves in a short time. Timken Bearings, Texrope to motor, etc. Up-to-the-minute Machines in every respect. High production Machines. . . . Made in many sizes, and for ALL KINDS of wire.

THE F. B. SHUSTER CO., New Haven, Conn.  
Straightener Specialists Since 1866

.... Consult  
**SHUSTER**

**THE CRACKERJACK**

A simple, practical, Automatic Wire Straightener and Cutter. Takes the wire from the coil, makes it perfectly straight and cuts accurate lengths. Will pay for itself in a month.

Booklet 'C' tells all about it.

THE FRANKLIN MFG. CO. New Haven, Conn.

### WIRE MACHINERY

Equipment  
for

SPRING	MAKING
SPECIAL	COILING
CABLE	ARMORING
LOCK	WASHERS
NAILS & STAPLES	
WIRE DRAWING	
WIRE ROLLING	

SLEEPER & HARTLEY, Inc.  
WORCESTER, MASS.

**COOK CAP SCREW MACHINES**  
for shaving CAP SCREWS under and over the head in one operation.

**COOK WOOD SCREW MACHINES**  
for making IRON AND BRASS WOOD SCREWS.

THE ASA S. COOK CO., HARTFORD, CONN.

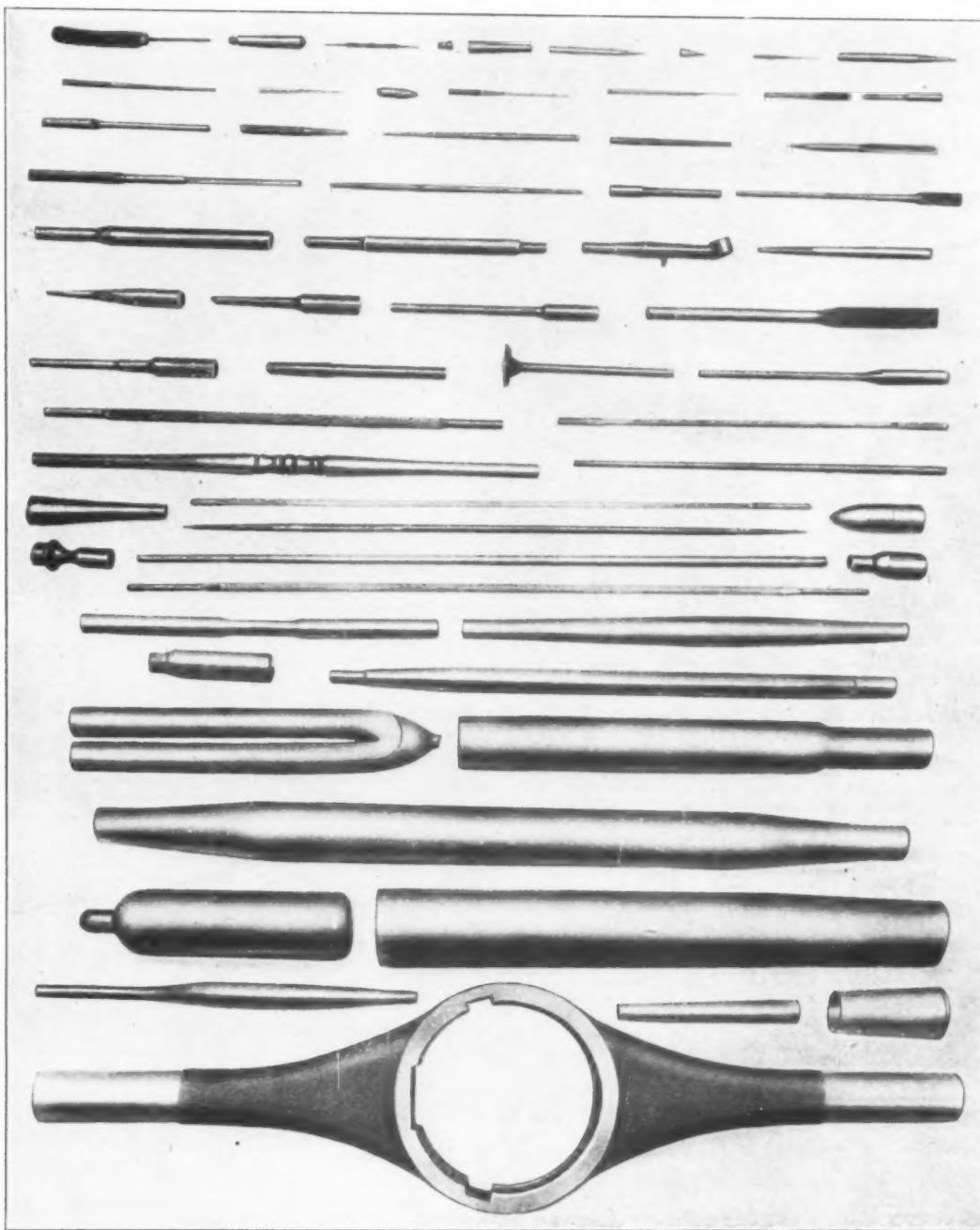
**WIRE STRAIGHTENING  
AND CUTTING MACHINES**  
Timken Roller Bearings—Texrope Motor Drive  
Sizes up to  $\frac{1}{2}$ "—Built for Hard Service

THE LEWIS MACHINE CO.  
1600 E. 24th STREET, CLEVELAND, OHIO

**THE  
DAYTON**  
TORRINGTON  
SWAGING MACHINE  
—with 4000 forceful  
squeezing hammer  
blows per minute—  
makes metal tougher  
and more elastic. Send  
for booklet—"The Modern  
Art of Swaging."

The Torrington Co., Excelsior Plant  
55 Field Street  
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## 50 Years Building Swaging Machines



*Samples of work swaged on Langelier Machines for most economically reducing, refining and saving metal*

We manufacture 25 types of Swagers with capacities from pin pointing to 5" diameter stock, our machines swaging such parts as Caliper legs, auto housings, tubular propeller shafts, drive shafts, stub shafts, gear shift levers, valve stems, motorcycle forks, steering knuckles, steering drag links, brake yokes, cutlery, textile spindles, tungsten filament wire, boiler tubes, superheater units, screwdrivers, taper tap shanks, ice and nut picks, dental instruments,

button hooks, oil can spouts, tapered axle ends, tie rods, wire spokes, temple butts for eye-glass frames, bicycle handle bars, nail sets, center punches, drift pins, knife tangs, wrench handles, ignition and carburetor control levers, machinists' tools, steering housing tubes, twist drills, wire pointing, baby carriage parts, jewelry, telephone parts, optical parts, tubing and miscellaneous forgings.

*Write for Circular "I-A."*

THERE'S NO SUBSTITUTE FOR 50 YEARS' EXPERIENCE

**LANGELIER MANUFACTURING CO., Providence, R. I.**

Designers and Builders of Hot and Cold Swaging Machines, Hammering Machines, Sensitive Drills, Multiple Spindle Drilling and Tapping Machines, Multiple Spindle Attachable Drill Heads, Automatic Drilling and Tapping Units, Foot, Power, Screw Presses.

## Time Saved Means Reduced Overhead

In 1929 one Etna Swaging machine was installed by the

**Hoskins Mfg. Co.  
of Detroit**

Four additional machines are now in operation in this plant because the management says they are good time savers.

One swager cares for 2-6 head blocks drawing Nickel-chromium wire to 14 to 16 gauge by 3 in. long.

YOUR production problems can be met by

**The  
Etna Machine Co.  
Toledo, O.**



No. 2A

### “STANDARD” SWAGERS

—the machines for higher efficiency and production on all swaging operations.

Rigid Construction, Long Bronze Bearings, Oil Reservoir. Adaptable to motor drive.

Capacities from 0" to 4 3/4".

**STANDARD MACHINERY CO.**  
Auburn, Rhode Island

**A COMPLETE LINE  
OF PORTABLE  
CONVEYORS**  
A MACHINE FOR  
EVERY  
HANDLING SERVICE  
PORTABLE MACHINERY CO., CLIFTON, N.J.

**ELEVATORS** Steam Hydraulic  
The Ridgway Steam Hydraulic Elevator is PERFECTION for the man who has steam or air available.  
**Hundreds in use in Biggest Plants**  
"HOOK 'ER TO THE BILER!"  
CRAIG RIDGWAY & SON CO., COATESVILLE, PA.

**Owen Buckets**  
Stronger and Built to Last Longer,  
Owen Buckets get "A Mouthful at Every Bite" and More Bites Per Day.  
OWEN BUCKET CO.  
6013 BREAKWATER AVE.  
CLEVELAND, OHIO

**MILWAUKEE**  
**CRANES and HOISTS**  
Standard and special overhead traveling cranes and hoists. Single line Grab Buckets. Write for bulletins.  
**MILWAUKEE ELECTRIC CRANE AND  
HOIST CORPORATION**  
Milwaukee Wisconsin  
Representatives in principal cities.

# See these versatile buckets on the job

NOW, by means of these movies, you may see Hayward Electric Motor Clam Shell Buckets actually at work on the jobs that interest you. Tell us when you will be in New York, and we'll gladly arrange to give you a private showing. Or, if you prefer, we will send the reels to you.

These movies show at a glance the versatile performance Haywards give on every job they tackle. Reel after reel reveals a Hayward's power. Every film is a convincing record of Hayward ability to play a leading part in the reduction of material handling costs.

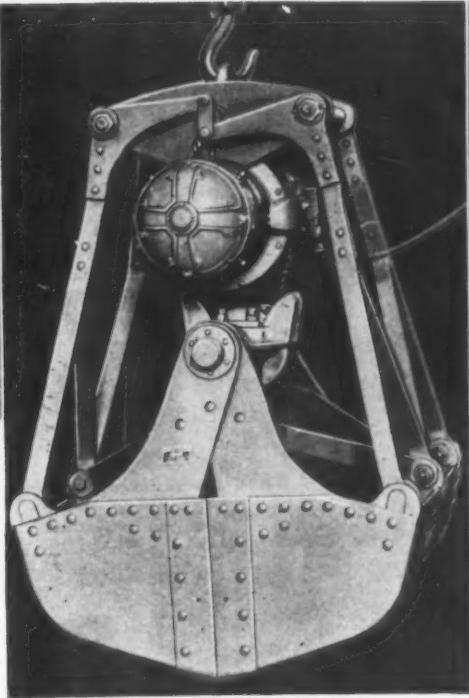
Having four different types of digging and rehandling buckets to draw from, makes a Hayward recommendation absolutely unbiased.

THE HAYWARD CO.  
46-50 Church St., New York, N. Y.  
403 Chester Twelfth Bldg., Cleveland, Ohio.

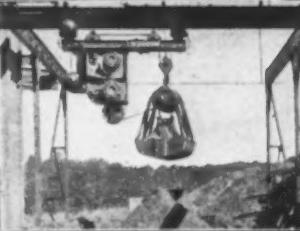
## Hayward Buckets

This Hayward saves labor by digging and handling foundry sand inside the plant.

Feeding coal from stock-pile to bins of boilers, is part of this bucket's daily job.



A Hayward Electric Motor Clam Shell taking a load of foundry sand from storage.



Hayward versatility enables cranes to handle all types of loads, including coal.



Orange Peel • Clam Shell  
Drag Line • Electric Motor

## BUFFALO SCALES FOR THE IRON AND STEEL INDUSTRY

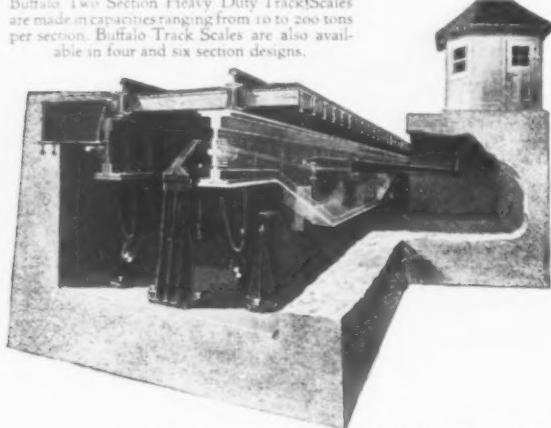
The increasing use of Buffalo Scales by leaders in the iron and steel industry can be explained in only one way . . . these scales have demonstrated their ability to weigh accurately day after day . . . year after year . . . under the hardest demands of service.

This exceptional accuracy is due largely to the high efficiency of their Suspension Bearings, which by reducing friction to a minimum, add greatly to sensitivity and weighing precision.

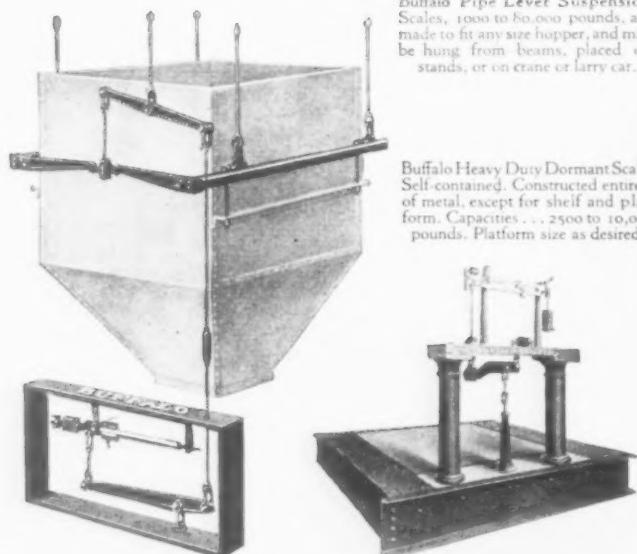
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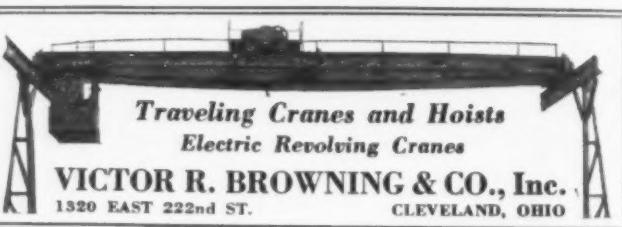
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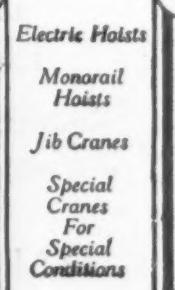
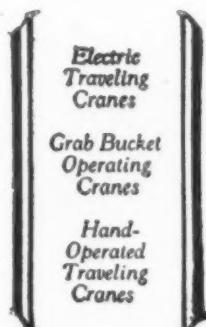
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58	100 tons
29	115 tons
12	125 tons
5	125 tons
44	150 tons
12	150 tons
2	160 tons
2	165 tons
2	175 tons
27	175 tons
3	200 tons
2	225 tons
1	250 tons
1	250 tons
1	275 tons
3	430 tons

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### COMBINATION CHARGERS AND STRIPPERS

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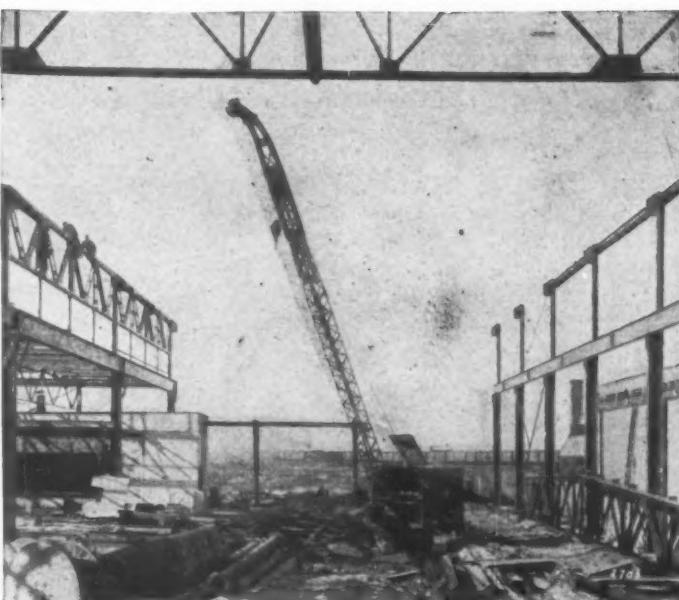
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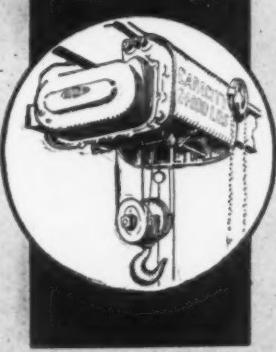
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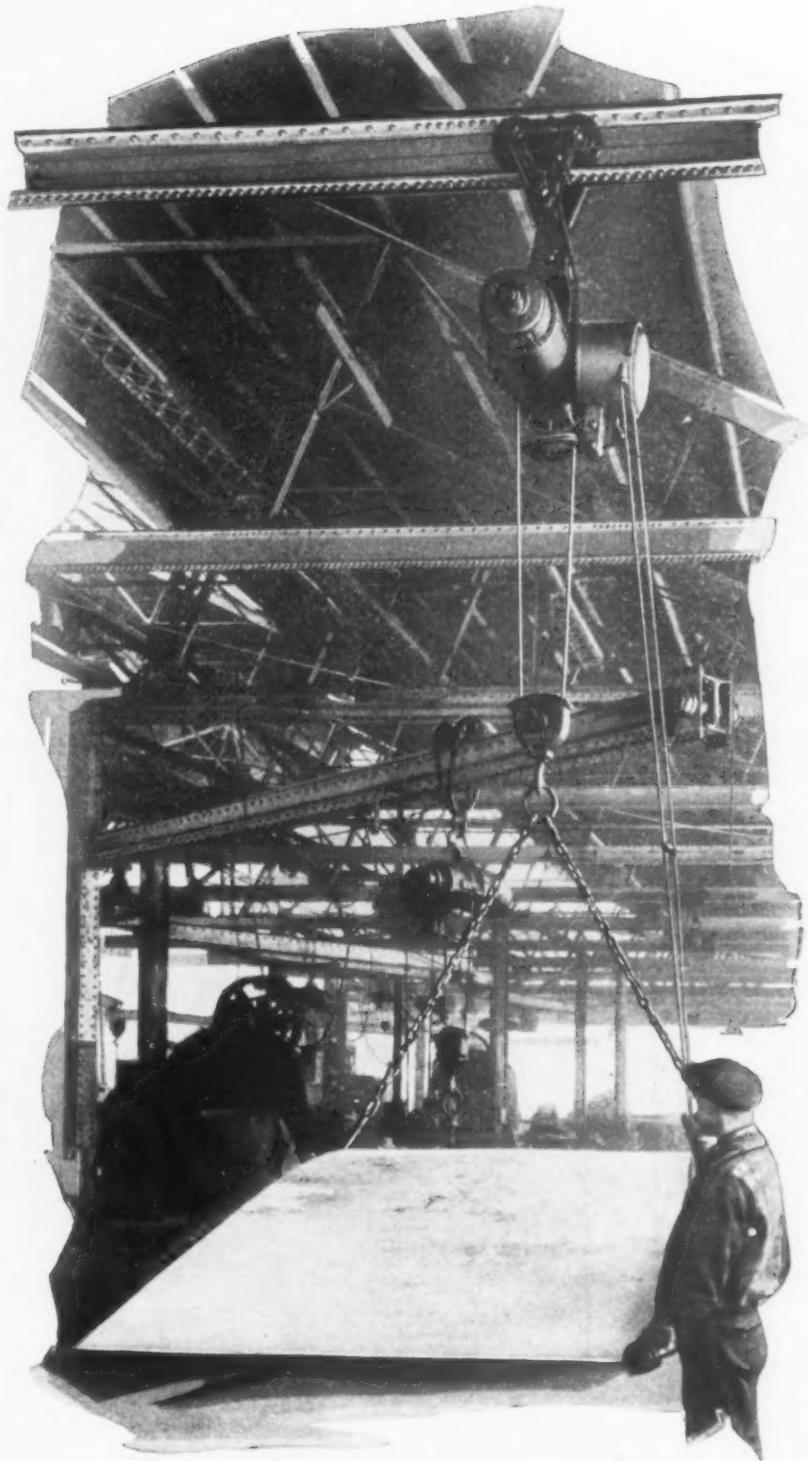
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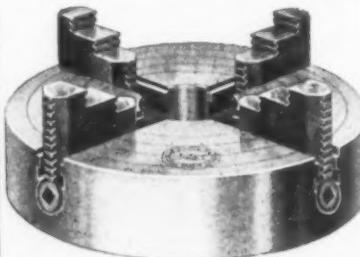
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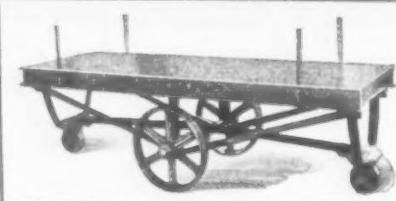
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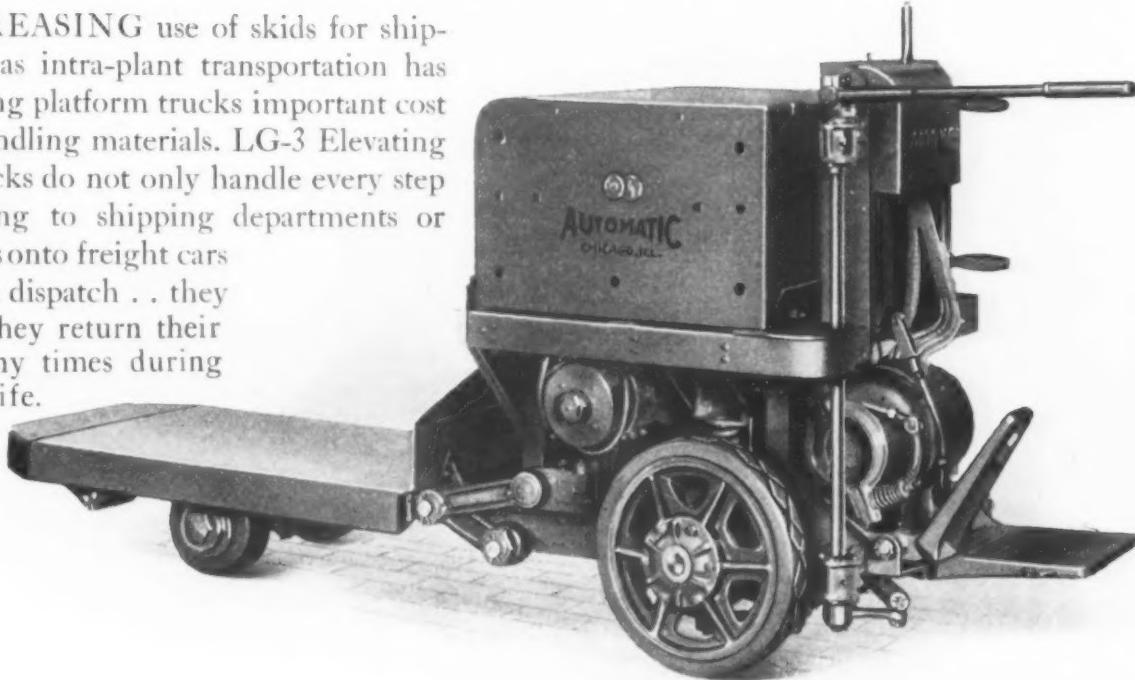
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## ELECTRIC MATERIAL HANDLING EQUIPMENT

THE INCREASING use of skids for shipping as well as intra-plant transportation has made elevating platform trucks important cost savers for handling materials. LG-3 Elevating Platform trucks do not only handle every step from receiving to shipping departments or loading docks onto freight cars with ease and dispatch . . . they do more . . . they return their first cost many times during their useful life.



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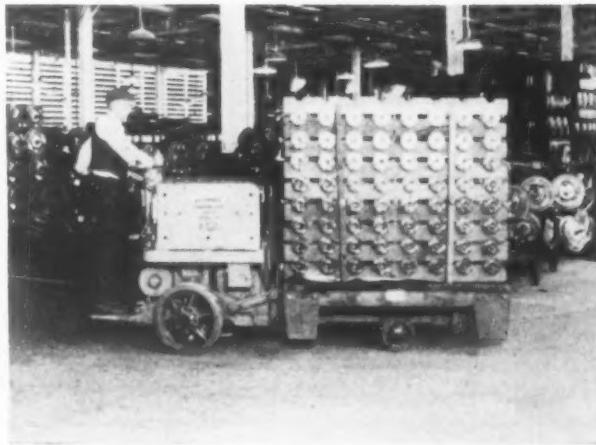
"LG-3" trucks are powered by spur gear drive—maximum power transmission from battery to tires.

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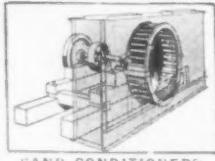
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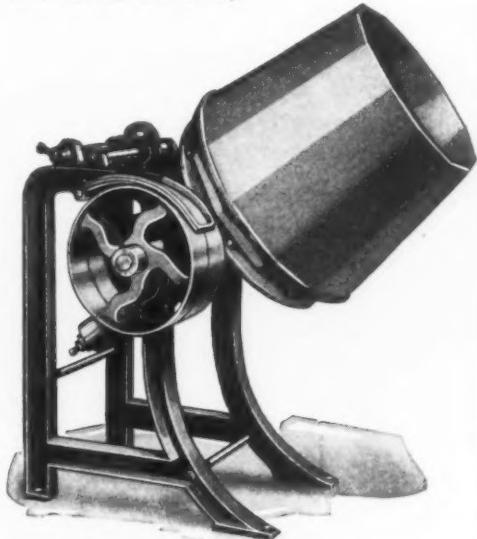
for blast furnace runners, open hearth and heating furnace bottoms, steel and  
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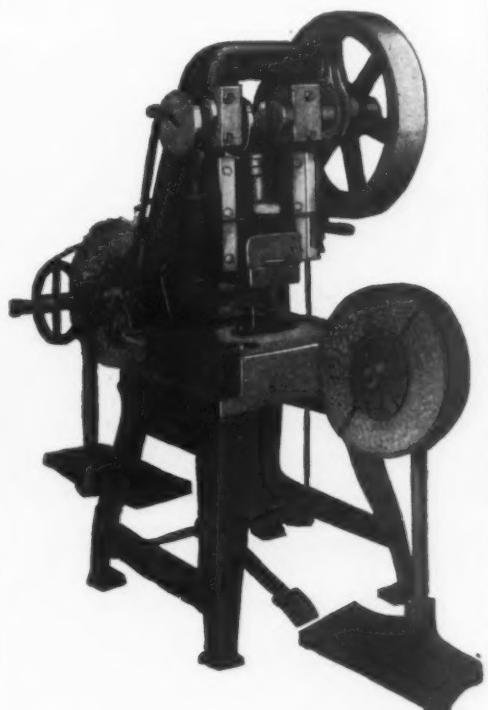
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for burnishing, rust-proofing, etc.



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ABOUT IT"**



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BAIRD Automatic Machinery for making parts from wire and ribbon metal.

BAIRD Automatic Die Punch Presses for high-speed blanking machines.

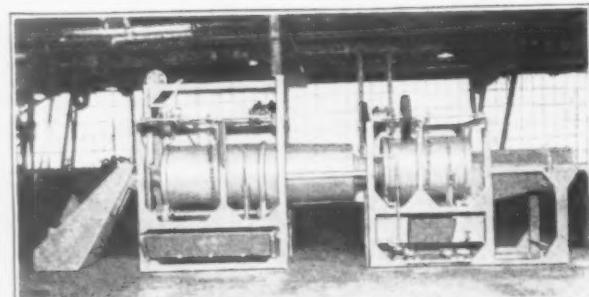
BAIRD Tumbling Barrels for burnishing and rust-proofing quantities of small parts are all just examples of Modern, Efficient Machines.

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**THE BAIRD MACHINE CO.  
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# Догнать Россию

( TRANSLATION:  
Catching up with Russia )

In the Amo Truck plant, in a suburb of Moscow, Russia, an Ideal Star Return Tumbling Barrel installation is at work, cleaning forged parts for motor trucks. This equipment was selected by the engineers on the basis of its performance on similar work in American forging plants.

The power loader of the Ideal barrel picks up a tote box full of forgings and charges the drum. There the forgings float in an excess of stars and steel grit, never touching each other. Scale is completely removed, thus increasing production in subsequent machining operations. Pressure on a button empties the barrel, the parts and tumbling material are automatically separated, the latter returning automatically to the barrel. The forgings are discharged into a drum which feeds a conveyor belt taking them to the next department.

### *In America*

Many an American forge shop has still to "catch up with Russia" in the rapid, economical removal of scale from forgings. Will you let our engineers discuss that with your engineers? No obligation.

*Put it up to  
Specialists*

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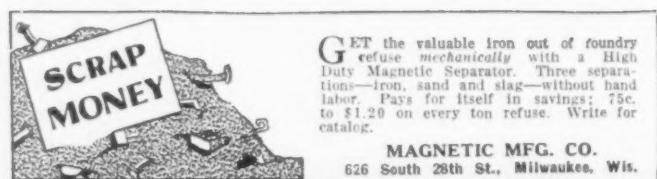
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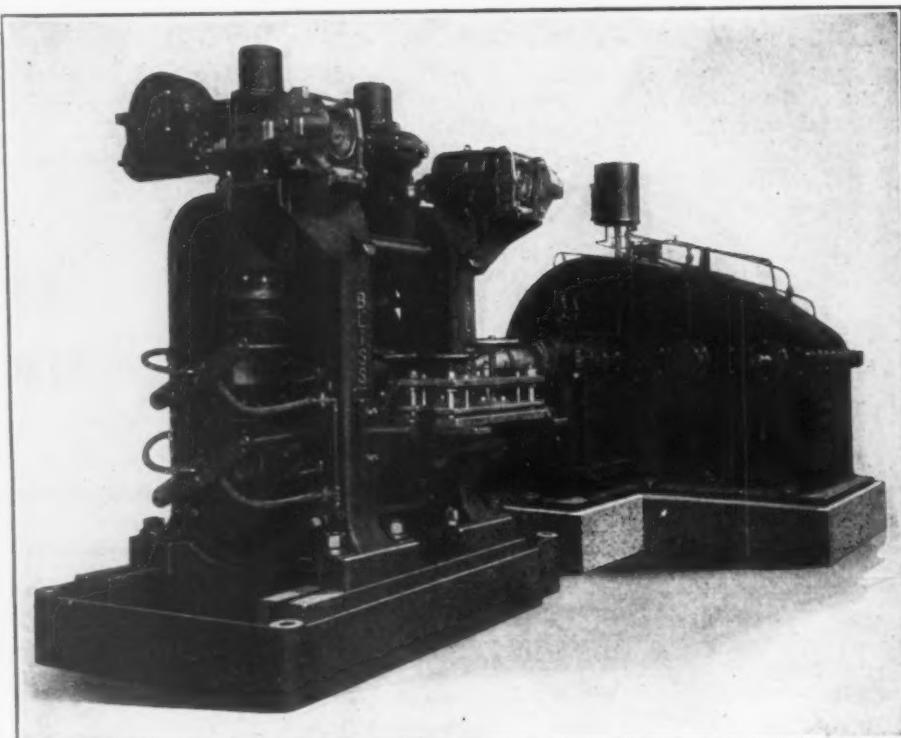
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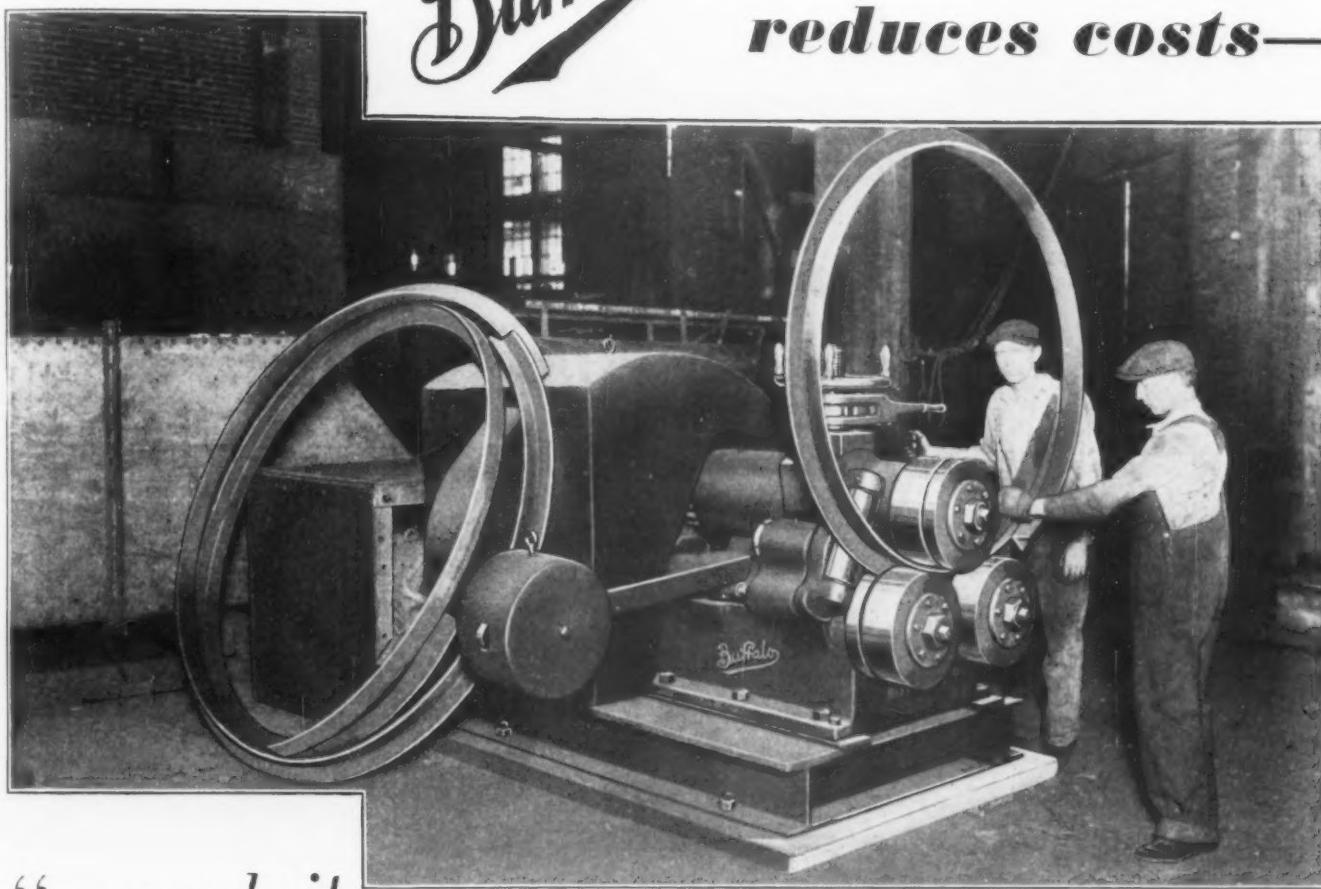
*Sales Offices:* DETROIT CLEVELAND CHICAGO ROCHESTER

PHILADELPHIA CINCINNATI NEW HAVEN BOSTON

*Foreign Factories and Offices:* LONDON, Eng. TURIN, Italy PARIS, France

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**"—and it does a smooth job with minimum number of passes"**

To save time  
and money  
in making bends  
of all kinds  
—get a

*"Buffalo"*

These are the exact words of the John Nooter Boiler Works of St. Louis, who find their Buffalo No. 2 Bending Roll a valuable addition to their shop. They have been using it for over a year and are well satisfied with the results.

The photograph shows the two employees handling one of their many jobs on the "Buffalo"—Bending

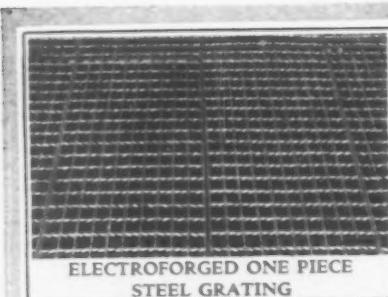
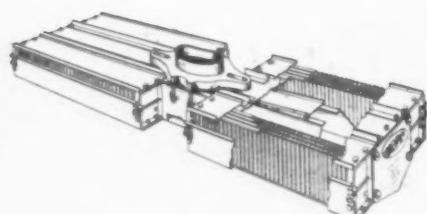
$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{3}{8}$  angles. The full capacity of the machine is  $4 \times 4 \times \frac{1}{2}$ ", leg out.

Maybe you have similar work, or work that a Buffalo Bending Roll could do quicker and for considerably less cost than you are doing it now.

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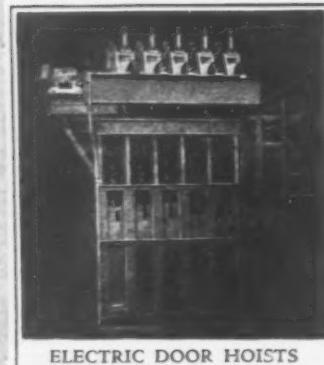
Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ontario

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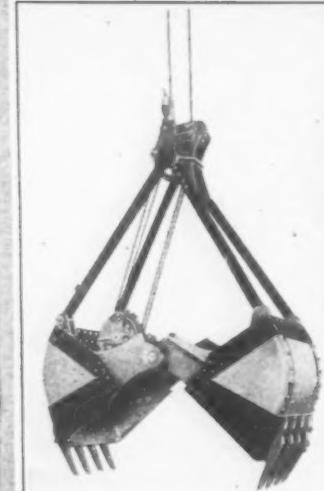
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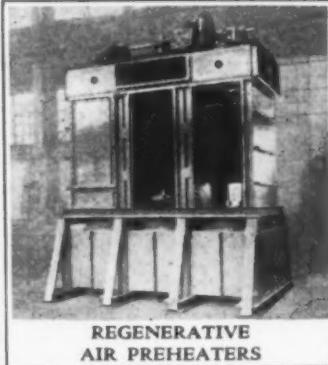
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Blaw-Knox International Corporation,  
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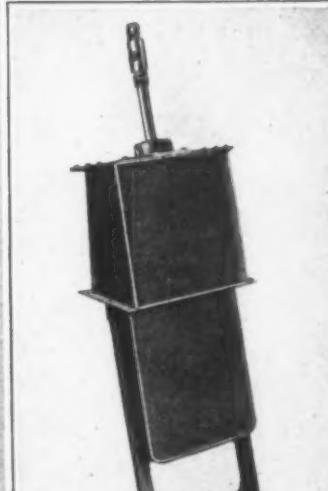
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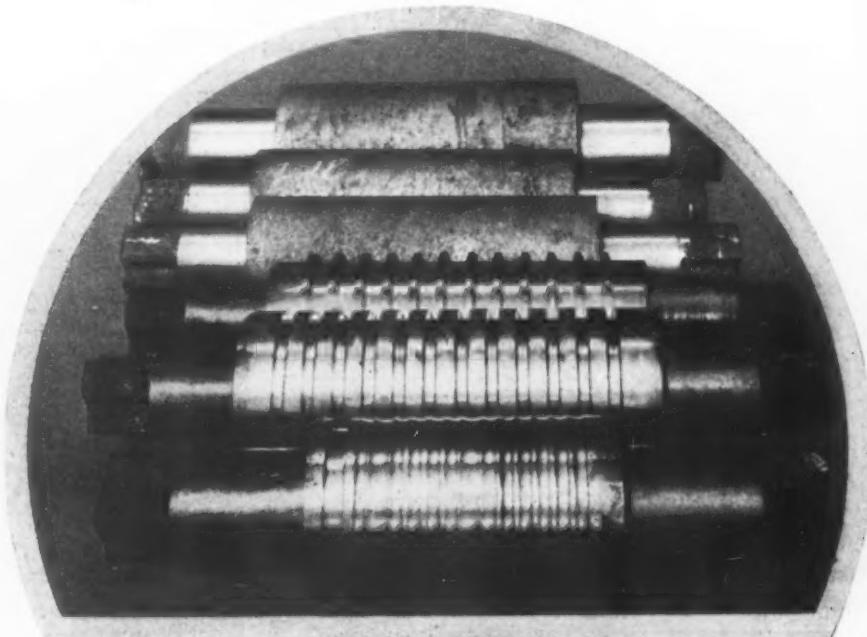
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Rolled 70987-250 lb. billets over a period of four months without refinishing.

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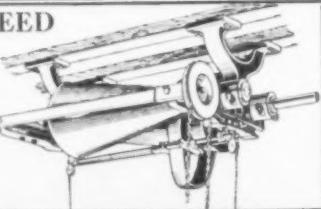
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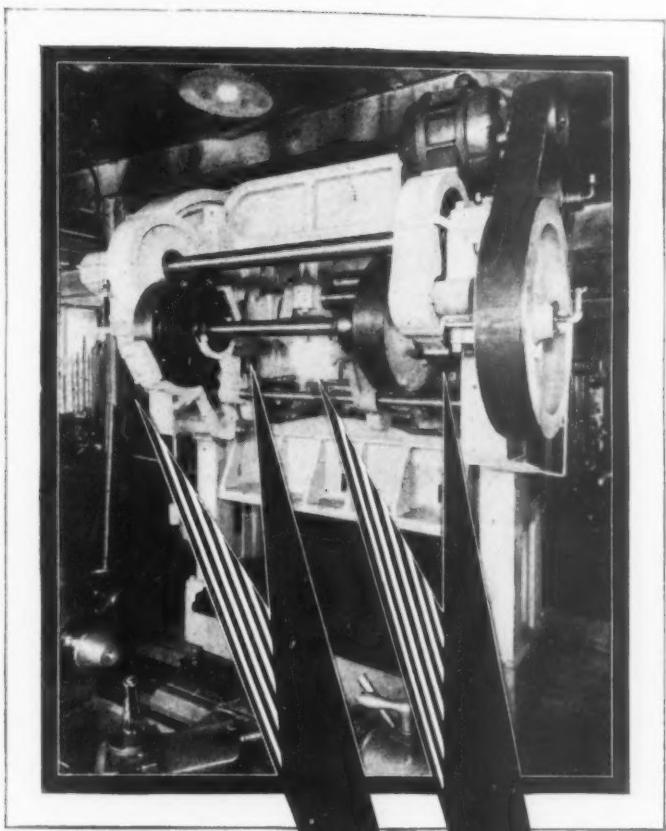
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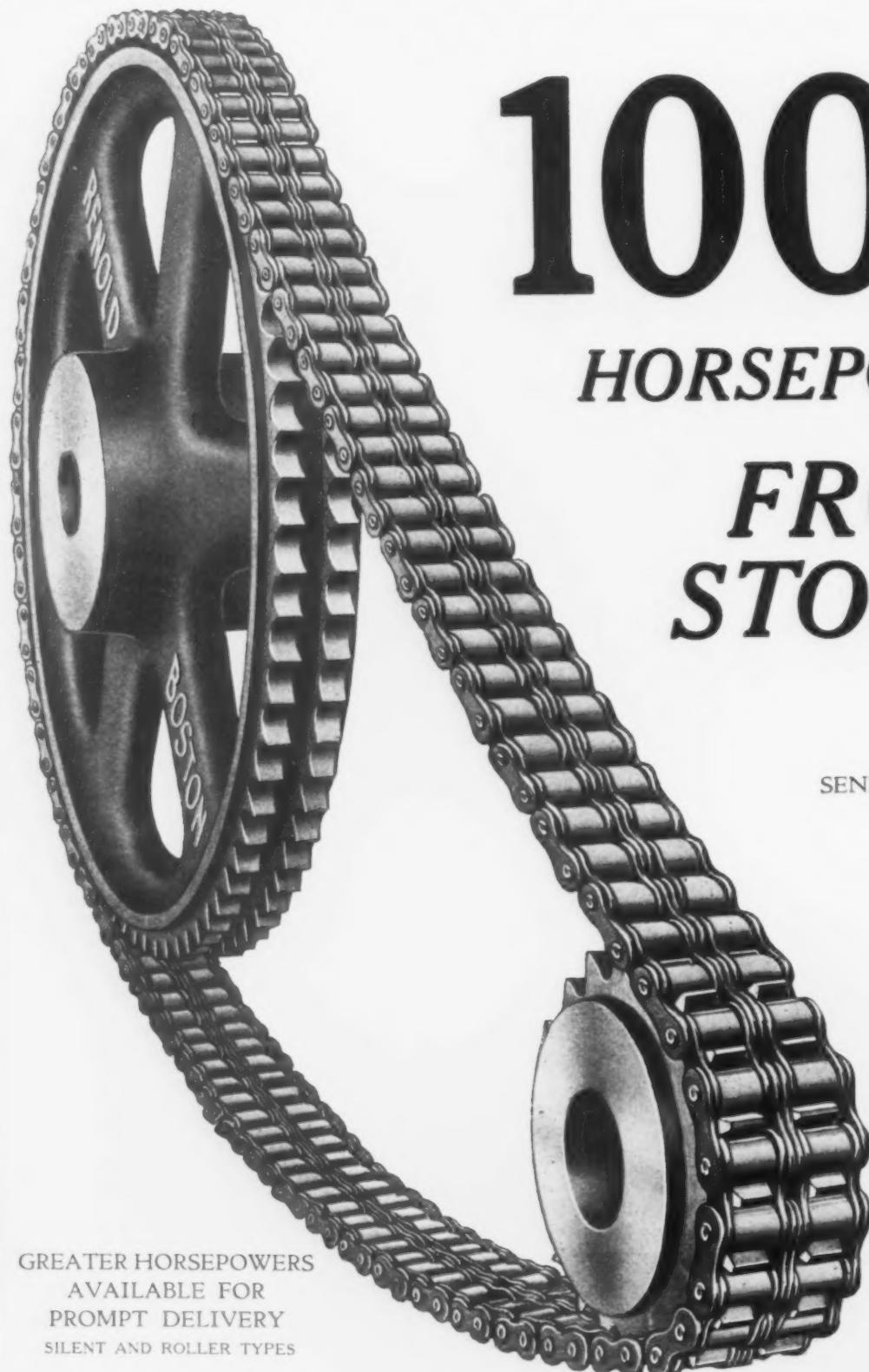
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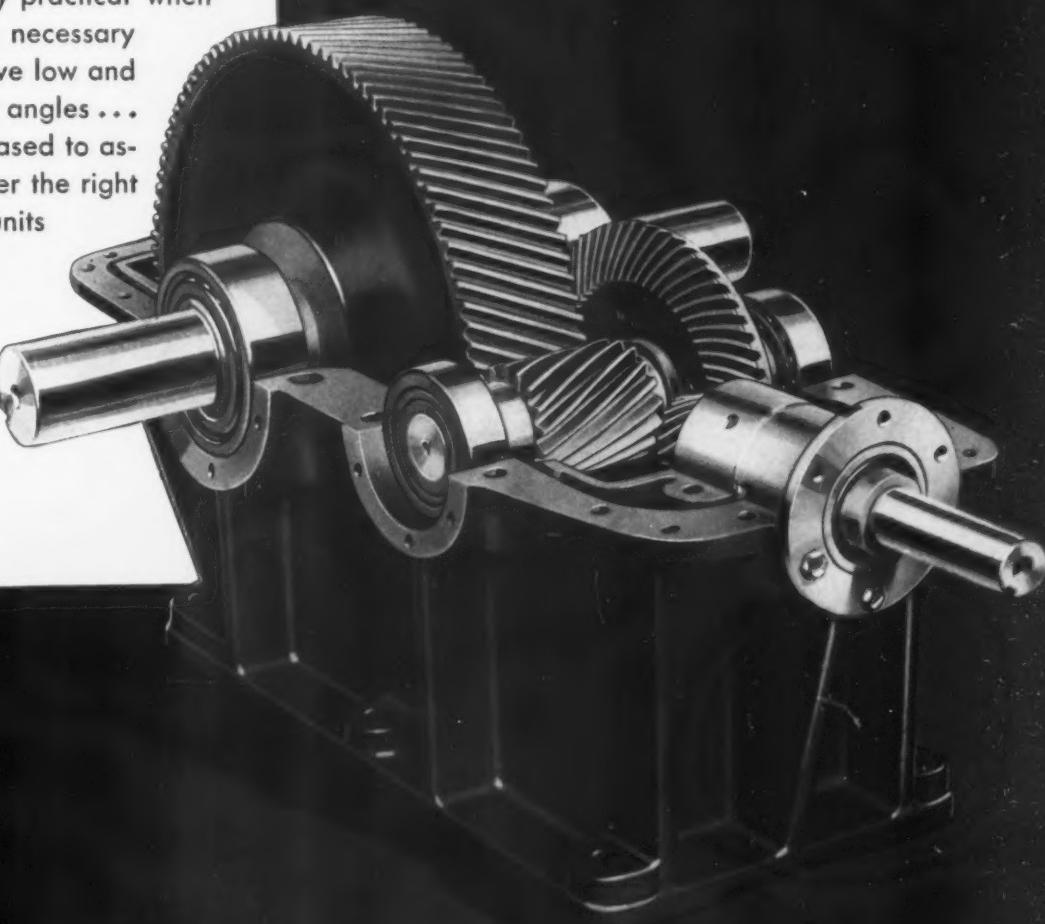
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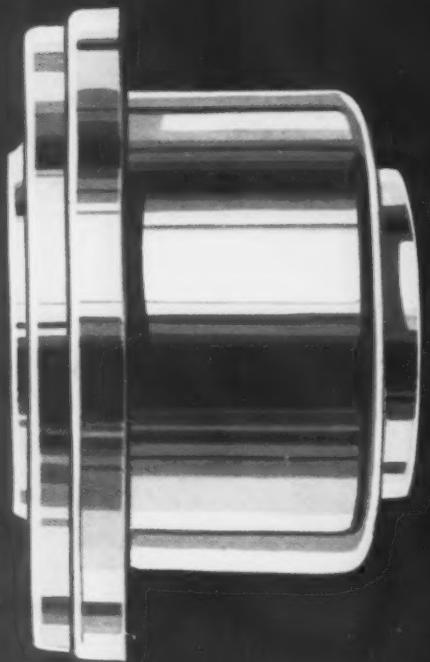
## SPEED REDUCERS



FALK . . . A GOOD NAME IN INDUSTRY

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## FLEXIBLE COUPLINGS



**Under Light Load** — the spring rungs fit in the grooves closely only at the outer ends. This gives a long free span between points of support and the power is transmitted throughout almost the entire length of the flexible rungs of the spring grid.



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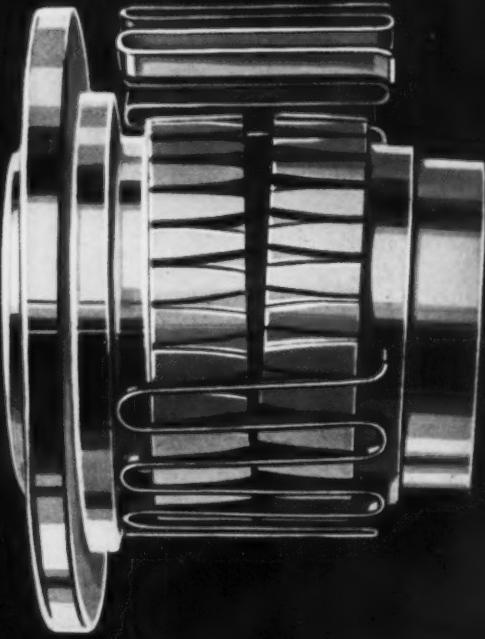
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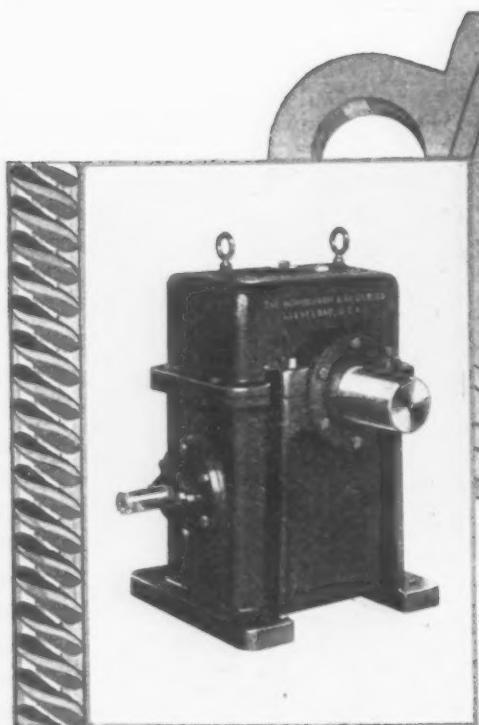


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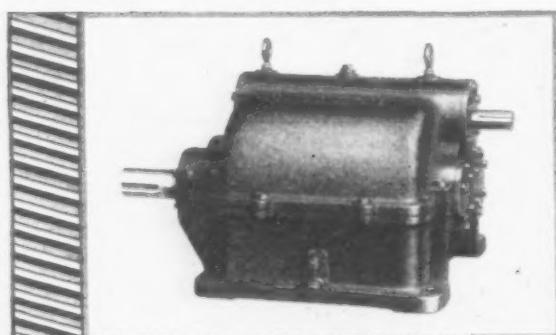
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**THE GEARS YOU BUY** will purr through a long life or quickly grind themselves away—depending on the care with which they were manufactured and the original selection of the raw materials. Jones Spur Gears, like the rest of the Jones Gear family—worm, herringbone, mitre, or bevel—are accurately and sturdily made from the finest materials—cut or molded from steel, cast iron, or bakelite. Whatever your gear requirements may be, and whether your orders are large or small, our specialized equipment will take care of you quickly. Our sales and engineering offices are in all large cities. You will like the way we handle your orders.

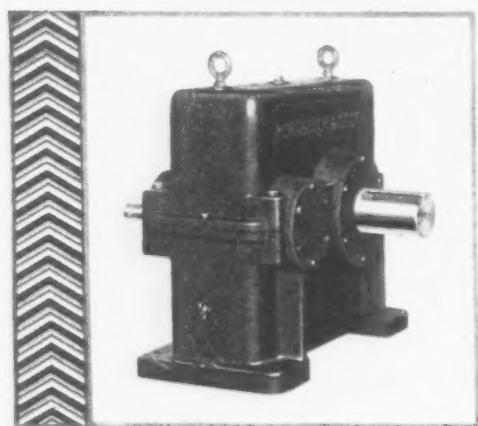
**W. A. JONES FOUNDRY & MACHINE CO.**  
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Worm Gear Speed Reducer

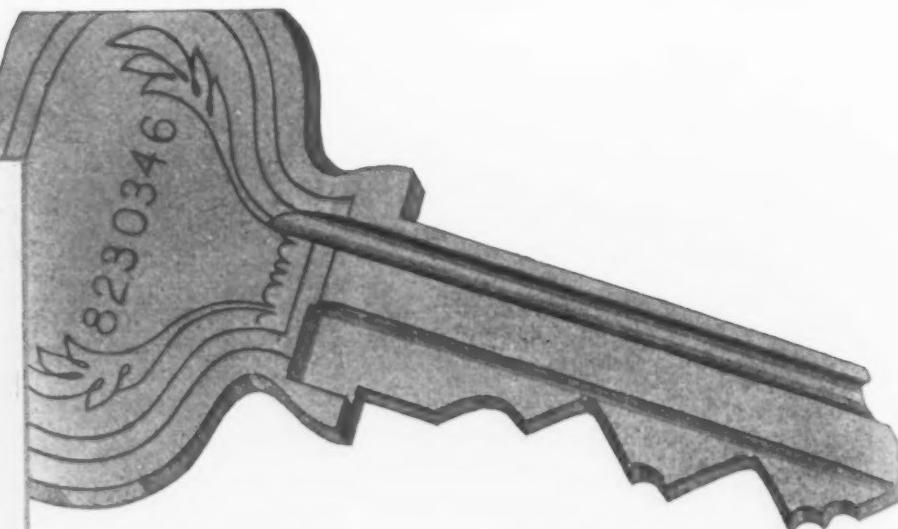


Heli-Spur Speed Reducer



Herringbone Speed Reducer

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. . . to every power transmission problem

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**Crane**  
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Constant Horse Power • Constant Torque • Variable Torque

These Multi-speed Motors have the added advantage of full protection to the stator, armature, and other internal parts of the motor, all of which are completely isolated from the outside air. They are particularly desirable in all installations where adjustable speed requirements must be met; and where dust or dirt are present in objectionable quantities—or where unusual dampness prevails such as in creameries, packing plants or outdoor installations.

They are built for 2, 3 and 4 speeds with wide or narrow speed ranges, such as 1800/1200 or 1800/600 down to 900/450 r.p.m. (60 cycle). Special speed combinations are available.

Built in standard sizes from  $\frac{1}{4}$  to 125 horse power, in normal torque, high torque and normal or low starting current types.

**CENTURY ELECTRIC COMPANY**

1806 PINE STREET • ST. LOUIS, MO.

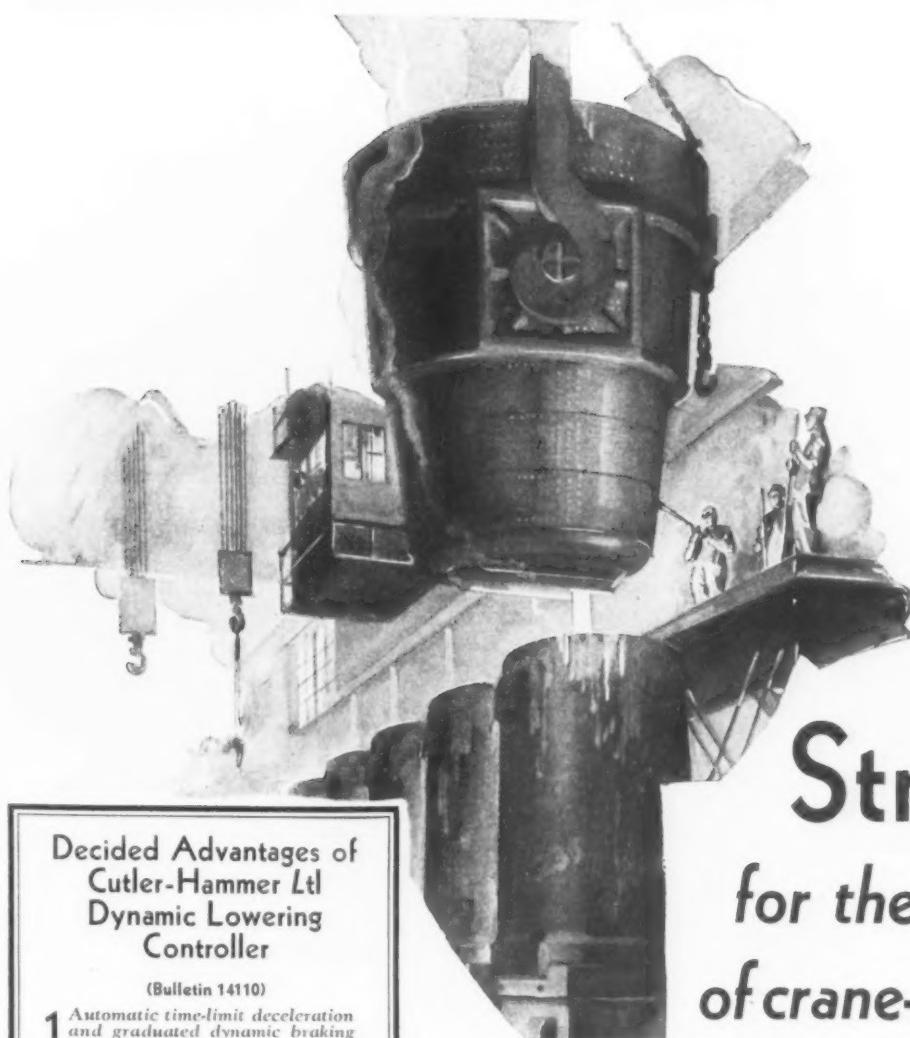
40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE,  
THREE PHASE,  
AND DIRECT  
CURRENT MOTORS

*Century*  
MOTORS

MOTOR GENERA-  
TOR SETS, ROTARY  
CONVERTORS, FANS  
AND VENTILATORS

FOR MORE THAN 26 YEARS AT ST. LOUIS



**Decided Advantages of  
Cutler-Hammer Ltl  
Dynamic Lowering  
Controller**

(Bulletin 14110)

- 1 Automatic time-limit deceleration and graduated dynamic braking for stopping from any speed. Particularly important, otherwise objectionable current-peaks, sparking at commutator and excessive wear on brakes are apt to occur.
- 2 Automatic time-limit acceleration on the kick-off or last point lowering. Insures fast kick-off, instantaneous release of brakes and freedom from excessive current-peaks.
- 3 Independent adjustment of acceleration in hoisting and deceleration in lowering. Important because it assures proper hoisting and lowering conditions and makes for greater ease and accuracy in spotting, less inching.
- 4 More accurate speed-control, regardless of load, either on hoisting or lowering—because of better spacing of speed-points, also because of low minimum speed which makes for more accurate spotting without need of so much inching.
- 5 High-speed lowering, providing loaded-hook speed 175% of full-load hoisting speed, light-hook lowering speed from 135% to 170% of full-load hoisting speed—or higher if desired.
- 6 Time-limit acceleration and deceleration are not dependent upon relays or delicate moving parts, assuring dependable action always with less trouble, delay, repairs and expense.

## Strength . . . for the "weak spots" of crane-hoist operation

FOR every "liability" and weakness encountered in crane-hoist operation, the Cutler-Hammer Ltl Dynamic Lowering Control provides a safeguard and a strength . . . in the kickoff, and freeing of the brake . . . in the deceleration and stop . . . against the current-peaks which might otherwise result in sparking at the commutator, or a runaway load.

The C-H Dynamic Lowering Control provides automatic operation on all movements of the hook. There is automatic time-limit acceleration for kick-off on last point lowering; and automatic time-limit deceleration on checking, graduated dynamic braking. These provisions make the work easier for the operator, easier on equipment and motors, keep down excessive current-peaks, save the brakes.

An additional factor of safety is provided by the automatic time-limit deceleration. Load is always under complete control. Should brake fail to take hold properly, operator can easily plug his motor without risk of excessive current peaks which might trip the overload

relay and thus throw load entirely out of control.

Adjustment of hoisting-acceleration is independent of adjustment for lowering deceleration . . . a necessity in view of the totally different conditions encountered.

Response to the master is instantaneous. The brake releases at once—(it always has on C-H Control)—even if master is thrown immediately to last point lowering. A wide range of speeds is provided; the minimum speed makes spotting easy without the need of so much inching; the maximum light-hook lowering speed is the highest consistent with safety.

Investigate the C-H Dynamic Lowering Controller thoroughly. This system provides the advantages of other systems plus superiorities no other can show. Details sent upon request.

**CUTLER-HAMMER, Inc.**

Pioneer Manufacturers of Electric Control Apparatus

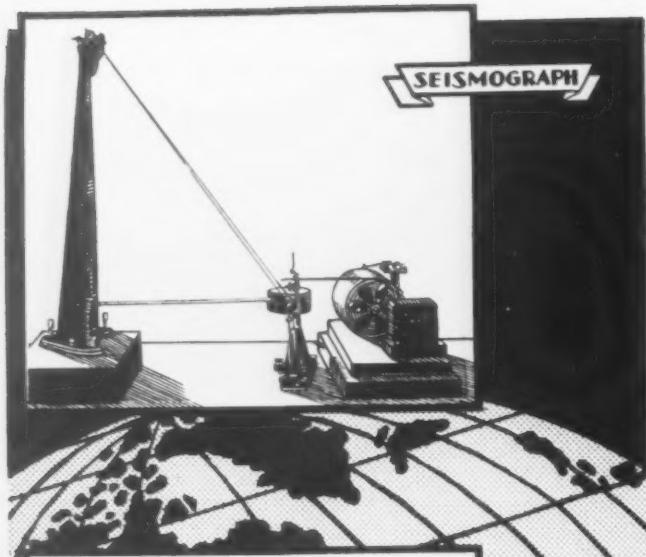
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MILWAUKEE, WISCONSIN

# CUTLER HAMMER

*The Control Equipment Good Electric Motors Deserve*

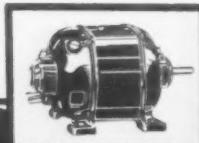
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## Attainment

**SEISMOGRAPH**—Here is modern attainment at one of its higher levels—the ability of man, aided by a little device, to detect the slightest quiverings of old Mother Earth, thousands of miles away, far below the surface. Then, we have the modern wireless daily picking "wave lengths" out of the air at a distance half the span of the globe from their source. That's progress. Add to these the measure of attainment necessary to create and perfect an electric motor, and you have a trio worthy of any man's wonderment and respect.

THE LELAND ELECTRIC CO.  
DAYTON - OHIO  
U. S. A.



**Leland**  
**motors**

$\frac{1}{8}$   $\frac{1}{6}$   $\frac{1}{4}$   $\frac{1}{3}$   $\frac{1}{2}$   $\frac{3}{4}$   $1$   $1\frac{1}{2}$   $2$   $3$



**MOLOCH  
POWER  
HAMMERS**

A Moloch Hammer in your shop will be an asset as long as the shop lasts. Guaranteed to give satisfaction, these hammers are real investments in service.

Belt or Motor Drive, made in sizes from 25 lbs. to 500 lbs.

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COMPLETE FORGING EQUIPMENT

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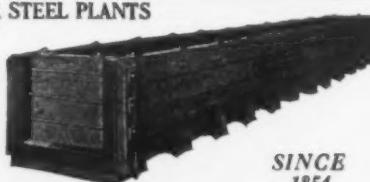
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Birmingham.....	1528 Fiftieth St., N.
New York.....	3149 Hudson Terminal
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Cleveland.....	2238 Midland Bank Bldg.
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SINCE  
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FABRICATED  
PLATE & PIPE WORK  
*for every INDUSTRY*

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BOILERS TANKS  
HIGH PRESSURE VESSELS  
*for any PROCESS*

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For Pickling or Storage of Acids.  
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TANKS FOR GASOLINE — OIL — AIR — ETC.  
COMPRESSED GAS CYLINDERS

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Permanent, high grade construction.

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Continuous and Regenerative Heating Furnaces.*

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Mechanical and Hand-poked Gas Producers, Steel Stacks, Tanks, Rotary Dryers, Calciners, Steel Riveted Pipe and Steel Plate Construction.

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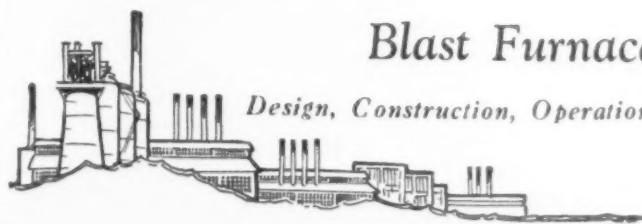
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To Meet  
Every  
Manufacturing  
Requirement

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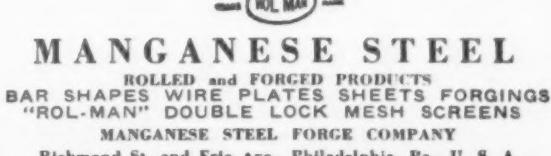
WHEELING STEEL CORPORATION, Wheeling, W. Va.



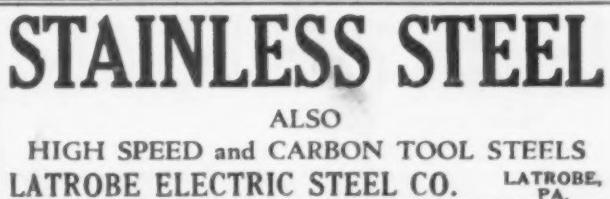
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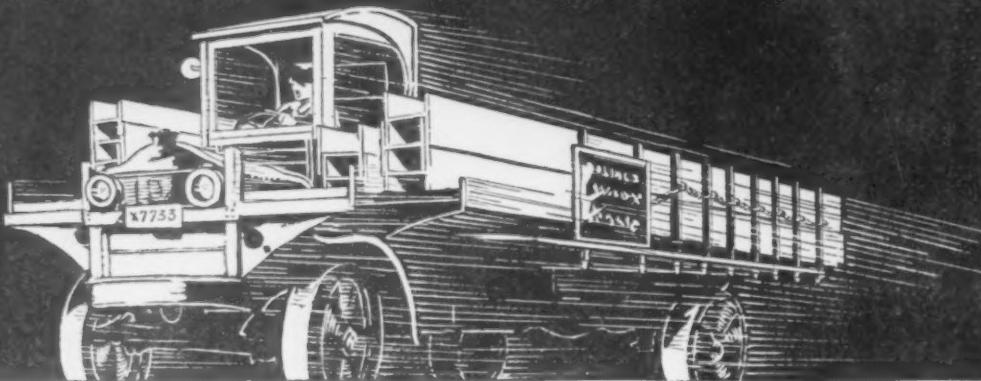


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Complete stocks carefully maintained . . . Prompt  
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*"The Largest Manufacturers of Ingot Moulds in the World"*

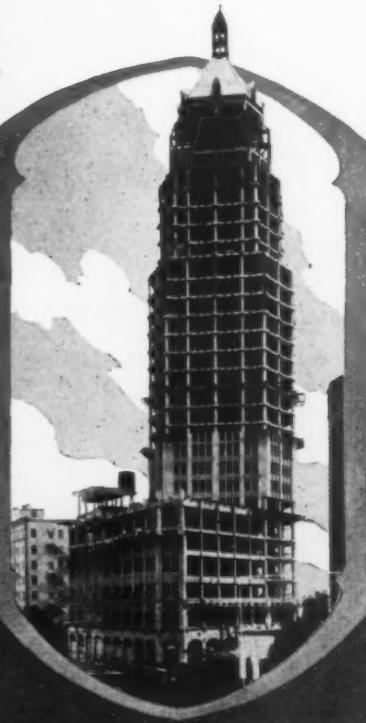
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McKenzie Construction Co., General Contractors.  
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Fabricators and Erectors of the Steel Work.

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Glorious Tower  
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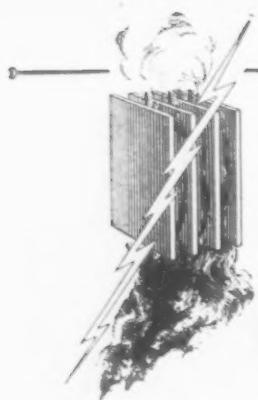


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for the removal of

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Carburetted Water Gas . . . . .	95%—99% "
Carbon and Lamp Black . . . . .	95%—99% "
Miscellaneous Applications . . . . .	90%—99% "

Our experience gained through the construction and successful operation of Cottrell Electrical Precipitation Process Installations of a total gas capacity exceeding 10,000,000 cubic feet per minute treating different types of gases enables us to intelligently study any new problem in gas cleaning. If our Process can be adapted, we are prepared to offer a complete installation guaranteed to effect the desired result.

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CLARITE HIGH SPEED STEEL  
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*It pays to use Good Tool Steel.*

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High Speed, Die and Special Tool Steels

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Standard and Special Shapes.  
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Good Tools Since 1836

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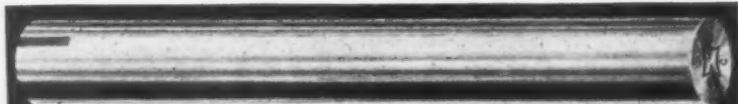
EDGAR ALLEN STEEL CO., Inc.

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TURNED and GROUND SHAFTS  
"Ground to Micrometer Accuracy"

CUMBERLAND STEEL COMPANY, CUMBERLAND, MD., U. S. A.



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DIE BLOCKS  
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STAINLESS STEEL  
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This is Number Seven of a Series of Advertisements

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INDUSTRY HAS ESTABLISHED  
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"The Rapid Duplication of Machined Steel Parts at Lowest Cost Continues to Depend Upon That Perfection and Precision Which Only the Cold Finishing Processes Can Give"

**THE COLD FINISHED  
STEEL BAR INDUSTRY**



**"DARWIN"**

**QUALITY**

*The ultimate in the evolution of*

**TOOL STEELS**

Non-Deforming, Oil-Hardening "NEOR"

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which can also be used in the form of

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Assured quality and service  
Pittsburgh Tool Steel Wire Company  
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GLOBE POLISHED - BLUE CHIP HIGH SPEED  
QUALITY - ACCURACY - UNIFORMITY

GLOBE WIRE COMPANY  
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**Manufacturers of High Grade Products**

**ROOFING TERNS**

Copper Bearing 8 lb. to 40 lb. Coated.  
Terne Roll Roofing

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Flat and Corrugated  
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Open Hearth Quality  
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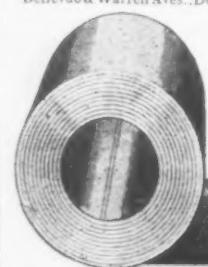
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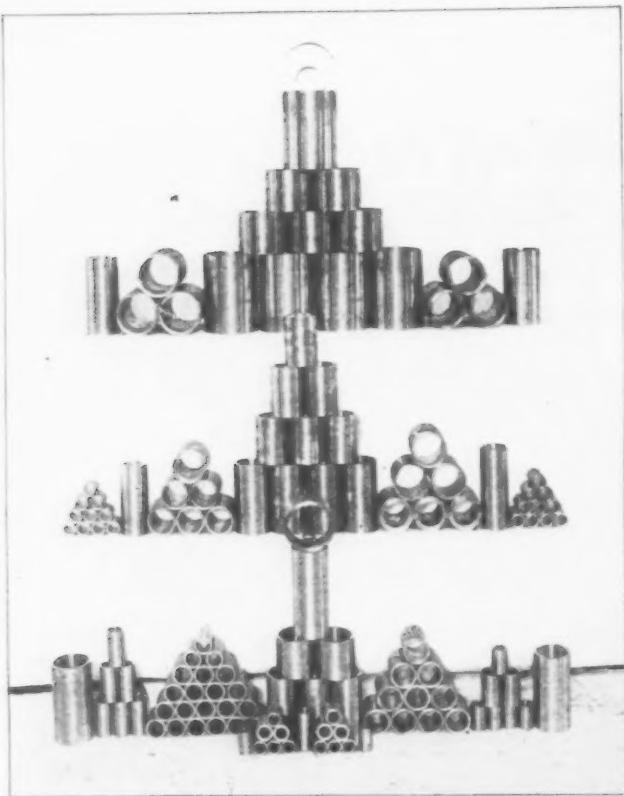
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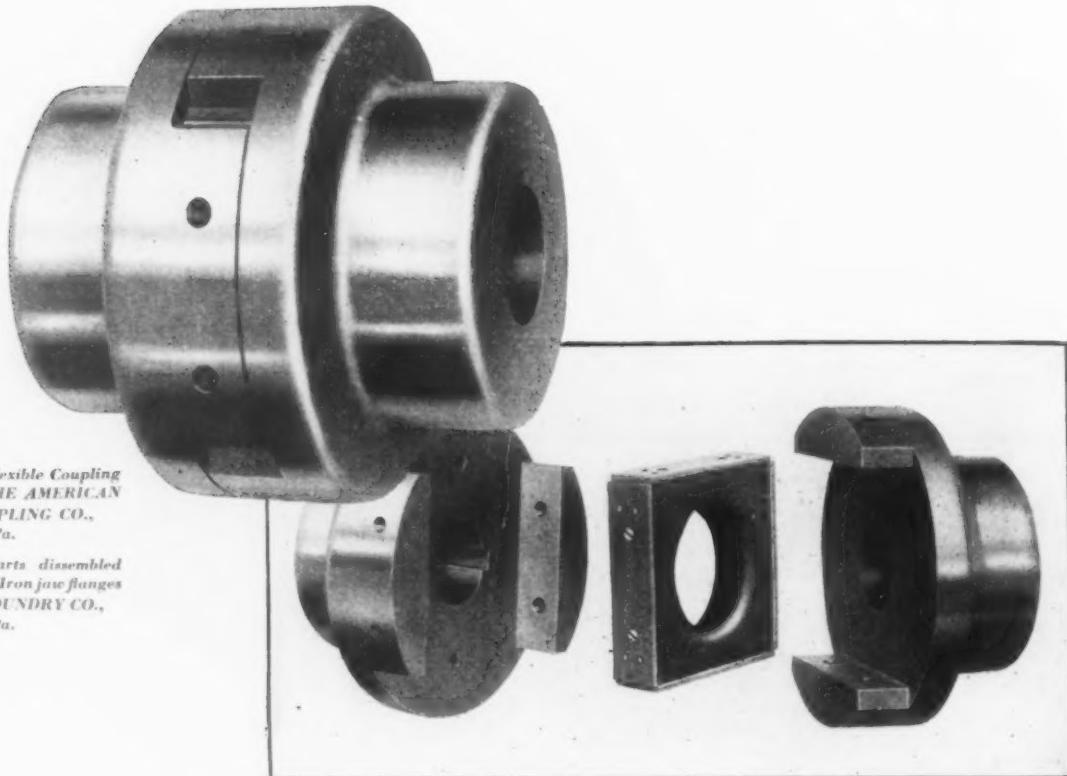
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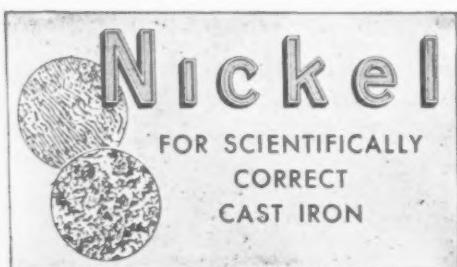
Above: American Flexible Coupling manufactured by THE AMERICAN FLEXIBLE COUPLING CO., Erie, Pa.

Below: View of parts disassembled showing Nickel Cast Iron jaw flanges cast by URICK FOUNDRY CO., Erie, Pa.

## NICKEL CAST IRON guarantees service in American Flexible Couplings



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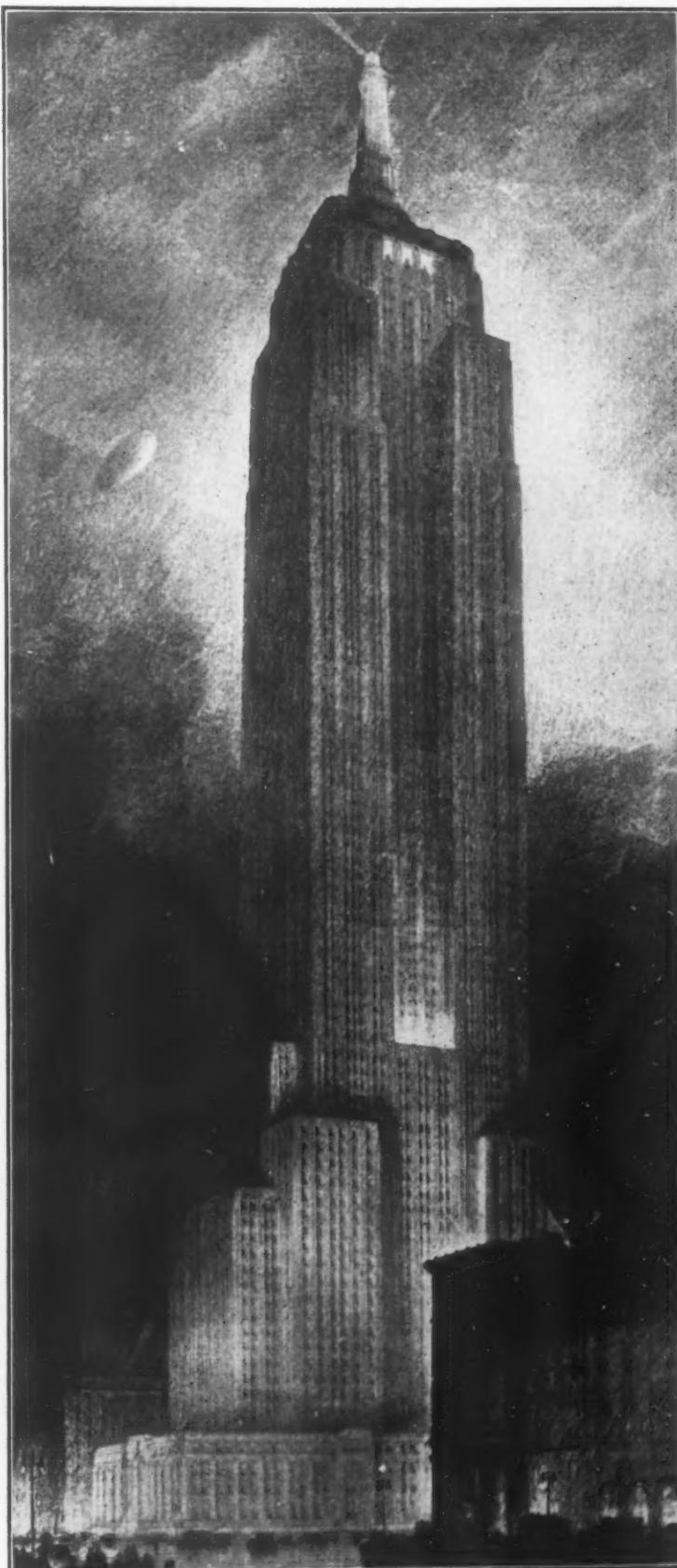
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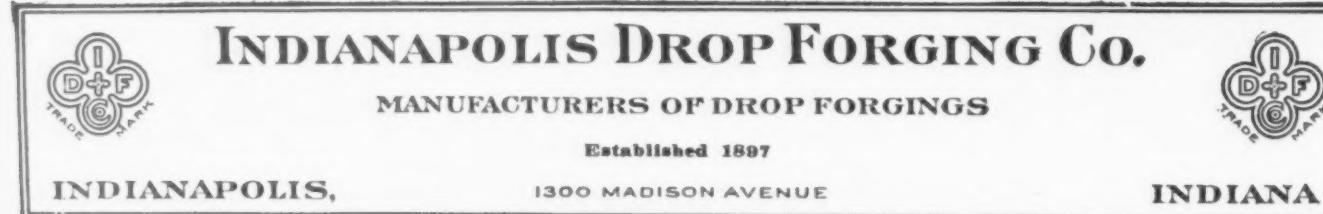
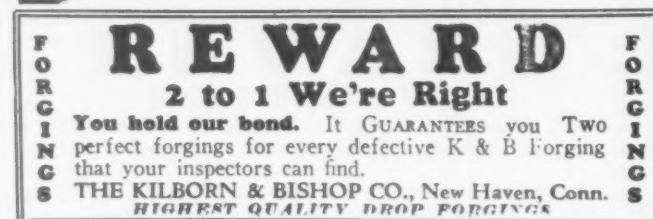
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Carbon Steel. Also Alloys chrome, nickel, vanadium. Modern plant. Good service.  
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STEEL CASTINGS UPTO 6000 LBS.  
Any Carbon or Alloy  
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to resist OXIDATION, CORROSION, ABRASION  
Modern equipment—Expert Metallurgical staff.  
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From a Pound to a Ton **ELECTRIC**  
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TENSILE STRENGTH ELONGATION  
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Steel castings of every description ~ Inquiries solicited  
**AMERICAN STEEL FOUNDRIES**

Address all communications to Dept. M.  
Room 1684 Wrigley Bldg Chicago

# Non-Ferrous CASTINGS

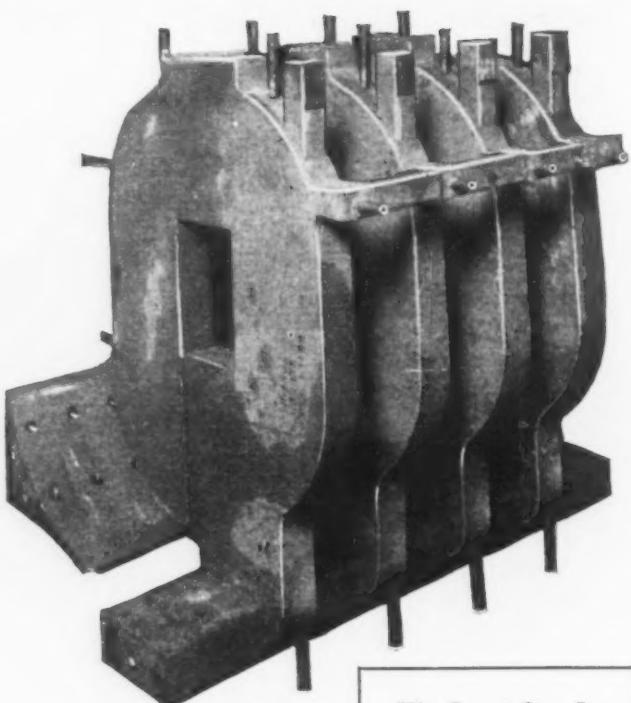
From 1 Oz. to 6000 Lbs.

The casting illustrated here contains 4500 lbs. of pure copper. We recently made four such castings for The Swift Electric Welder Company of Detroit. The iron pipes shown are cast into the copper.

Our wide range capacity also includes various kinds of metals—Aluminum Bronze Welding Dies, Acid-Resisting Castings, Manganese Bronze, Aluminum Alloys, Pure Copper Castings—made to your specifications.

If you require non-ferrous castings of higher quality, let us give you our quotations without any obligation to you.

**The John Harsch Bronze & Fdry. Co.**  
11612 Madison Ave., Cleveland, Ohio



We Specialize In  
Pure Copper Castings  
Acid Resisting Castings  
Manganese Bronze  
Aluminum Bronze for  
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**SMALL ELECTRIC STEEL CASTINGS**  
(Capacity 500 Tons per Month)  
THE  
WEST STEEL  
CLEVELAND  
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*"He Profits Most  
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CERTIFIED MALLEABLE CASTINGS  
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Prompt Service and Shipments  
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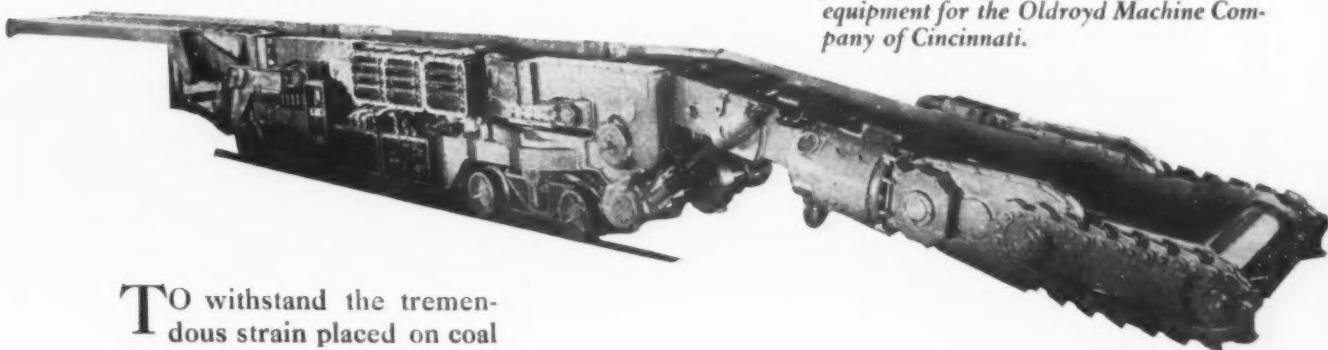
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**AMERICAN  
STEEL FOUNDRIES**

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# OLDROYD COAL CUTTER & LOADER

*Castings by COMMERCIAL*

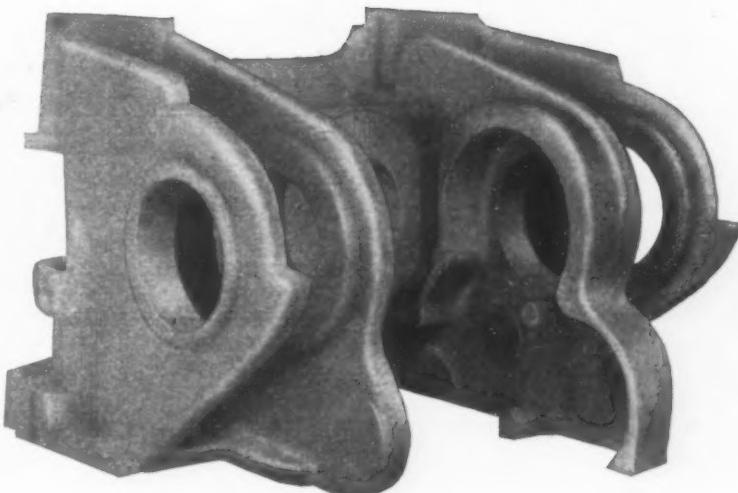
*Oldroyd Coal Cutters and Coal Loaders provide for the most economical and rapid handling of coal from the seam to the mine car. The Webster Mfg. Company of Chicago, Ill., manufacture this equipment for the Oldroyd Machine Company of Cincinnati.*



TO withstand the tremendous strain placed on coal mining machinery, the main construction especially must be built of the sturdiest castings available. Tensile strength is what counts

The Webster Mfg. Company has taken this into consideration in selecting The Commercial Steel Casting Company to furnish all of the main castings for Oldroyd coal cutters and coal loaders.

Skilled workmanship, highest quality steel, freedom from imperfections, and carefully worked out tensile strength requirements — these are the things that stand for Castings by Commercial.



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*Subsidiary of The Osgood Company*

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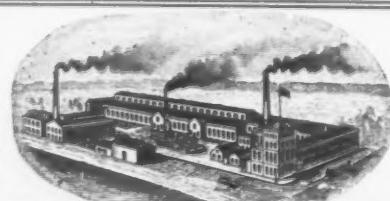
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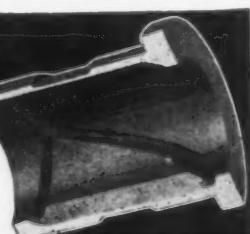
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—is just one of the many different kinds of stamped, drawn, and pressed metal parts we produce in large quantities. Let us give you an estimate on your work—or let our engineering department make recommendations.



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We Do Difficult Stamping Jobs Well  
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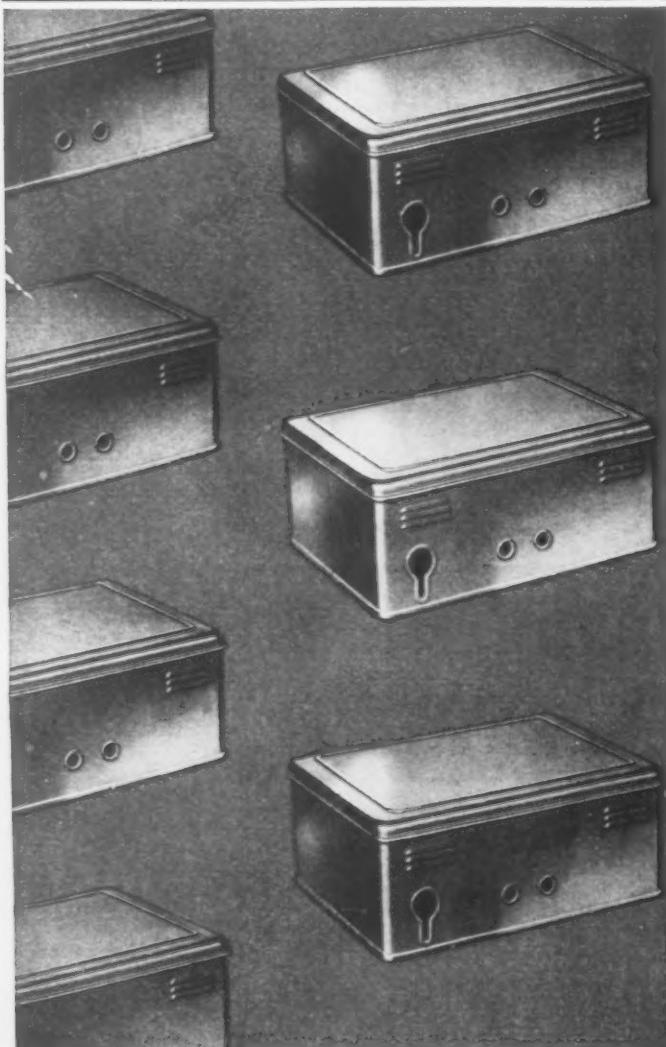
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PARTS IN ANY COMMERCIAL  
METAL AND IN ANY FINISH  
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Over 30 Years' Experience*  
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IN ALL METALS AND GAUGES.  
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# WHY . . . Metal Stamping Quotations Vary So Much . . .



The essentials in producing this radio cabinet were interchangeability of parts to save assembly time, and attractive appearance. G. P. & F. engineers found a way to combine these two elements successfully and economically.

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STAMPINGS**



19 ACRES OF  
FLOOR SPACE

## IMPORTANT FACTORS to Consider in Bids You Get

WHEN quotations on metal stampings vary considerably, experienced buyers do find out the reason for the difference before placing the order.

Often it is found that the blueprint submitted is made up with a casting in mind, or with features which are not practicable, or without specific tolerances indicated. Naturally, such blueprints are interpreted differently by the various bidders, which reflects in the quotations.

In securing bids all of these factors should be taken into account, especially the correct indication of tolerance requirements, as tolerances affect the piece price very materially. This procedure provides a definite basis for all bidders to work on, and prevents trouble later on.

The final consideration is the stamping experience of the bidders. G. P. & F. this year celebrating its fiftieth anniversary, has the background necessary to appreciate the problems involved in practically every kind of light weight and medium stamping. Thus, in addition to quoting intelligently G. P. & F. is able to offer suggestions that often not only improve the design but lower production cost as well.

Why not consult G. P. & F. for suggestions and quotations?

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# STAMPINGS BENEFIT EVEN CAST STONE

**Old-time cast-iron moulds cost 54% more than Bossert Stampings—were 64% heavier. Stampings speeded production and improved the product.**

**Y**OU will find interest in this episode of the cast-stone industry because it illustrates the wide usefulness of pressed metal—its wide adaptability.

Cast-stone, a cement product, is poured cold in moulds. The stone must harden smoothly and accurately like a die-casting, because cast-stone obviously cannot be "machined" after casting. At the foot of this column is a photograph of the stamped mould. The old-time casting cost 54% more to begin with, and weighed 64% more. The stamped mould is much stronger. It never breaks when dropped. Breakage of cast iron moulds was frequent. Its lighter weight enables a man to lift it more easily—hence he can lift more in a day. Multiply this alone by a corps of men—the effect on production is clear.

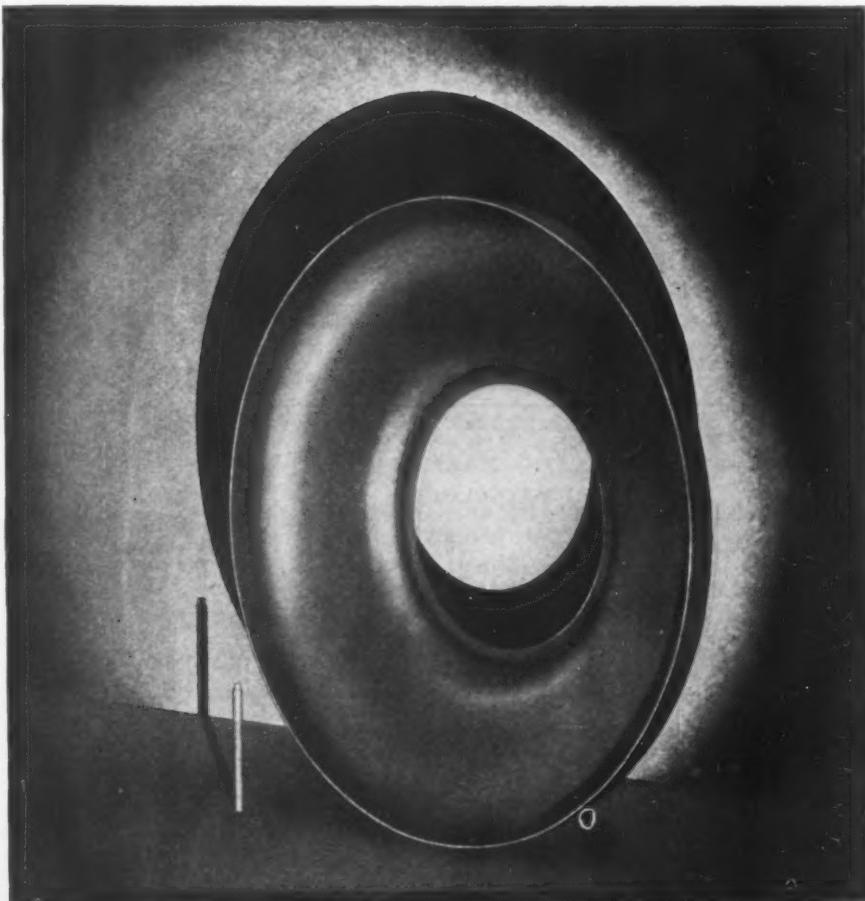
The smoother, more accurate surfaces of the stamping produce smooth stone. It is so smooth that it appears almost to have been chiselled and polished by hand; and it fits as though machined.

It is gratifying to see how Bossert stampings benefit an industry so remote from manufactured metal parts. And there is food for thought in this for every industry everywhere—"wouldn't stampings be better for us, too?"

**BOSSERT STAMPINGS**—light and heavy—are used to advantage by nearly every industry. A huge plant, with complete equipment, assures fast quantity production.

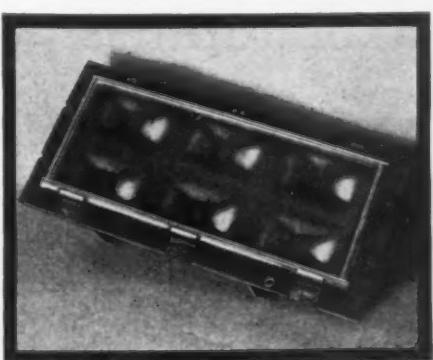
Below are two interesting Bossert stampings—a drum head for a concrete mixer and a one piece, drawn steel bottle. They show the great versatility of the Bossert organization.

A copy of the intensely informative Bossert book, *Metal Stampings*, awaits your request. Send for it now. It gives you a definite idea of the Bossert organization and explains Bossert re-designing service. The Bossert Corporation, Utica, New York. Offices in New York, Philadelphia, Cleveland and Detroit.



Drawn steel bottle  
Height 12 inches

Concrete mixer drum head  
Height 53 inches



## BOSSERT STAMPINGS



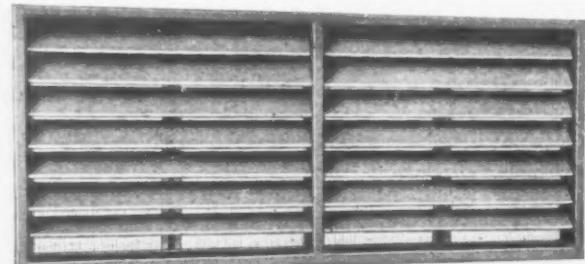
## Good Will Can't Be Measured In Dollars and Cents

It doesn't take much to obtain a customer's good will—prompt delivery, efficient service, a quality product and it's done.

The best evidence of the "goodwill" obtained by WORCESTER STAMPED METAL PARTS is shown in the increasing number of orders received—not only from our old customers, but from their friends as well.

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Successors to W. & S. Mfg. Co.  
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### SHUTTER LOUVRES

In any quantity desired. We are in a position at this time to give you an attractive price and prompt delivery.

We also make stamped Louvres with permanent openings to your requirements.

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Our present customers represent many of the most discriminating parts buyers in the automotive, furniture and general metal goods fields. May we serve you?

### AKRON-SELL CO. AKRON OHIO 43 Years in Business

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BRASS  
BRONZE·COPPER  
AND ALUMINUM

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BRIDGEPORT BRASS CO.  
BRIDGEPORT, CONN.

## Metal Stampings

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JOURNAL BOX LINER  
for roller bearing railway truck.



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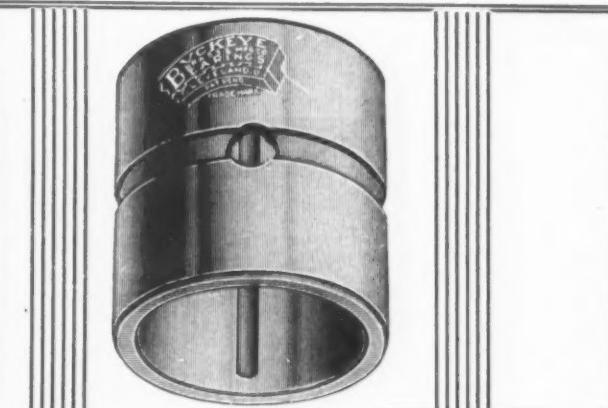
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BETTER BUILT  
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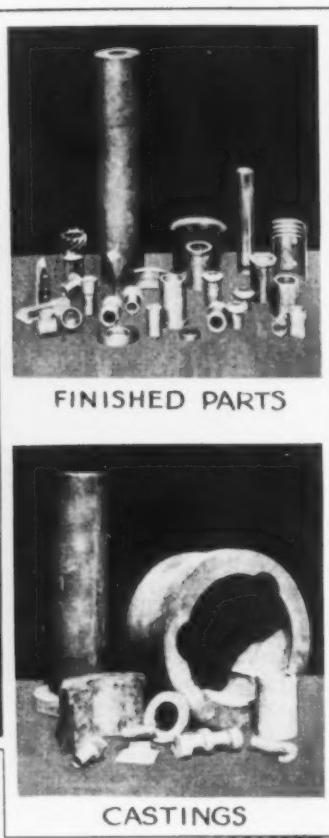
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Sustained accuracy, service that is dependable, and speed that is safe. These are the results of good bearings—the difference between profit and loss when expenses are figured. Consult us about your problems.

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*A trial order will convince you of its worth. If you are not entirely satisfied, return it and you pay nothing.*

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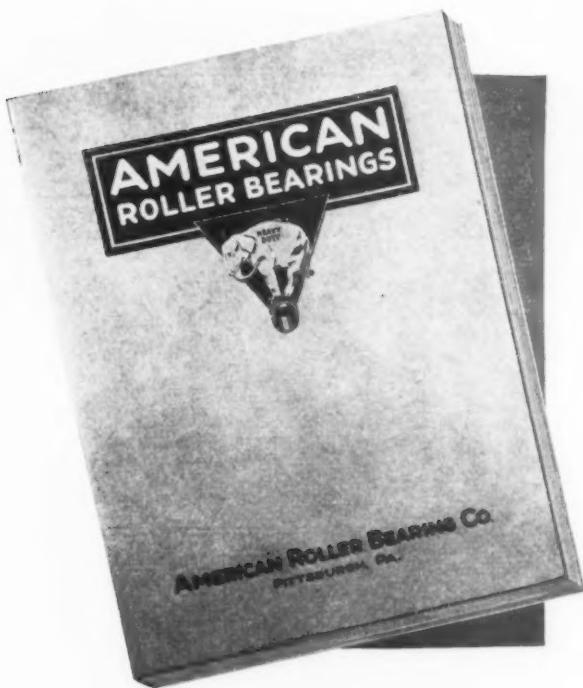
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Made by Olson are as good as twenty-five years' experience and up-to-date equipment can produce. To end your screw product problems, call on Olson.

Made in all sizes up to 2 $\frac{1}{4}$ " in steel and brass.

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53 Commercial St., Worcester, Mass.  
New York Office—5 Beekman Street  
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SOUTH BEND INDIANA  
JOURNAL — RADIAL — THRUST  
Ball and Roller Bearings,  $\frac{1}{2}$ " to 40" in diameter—  
ONE OR A MILLION. Standard and special size.  
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**UNBRAKO**

281,500 LBS.

that's the ultimate strain per square inch of a  $\frac{1}{4}$ " "Unbrako" Socket Head Cap Screw according to the Olsen Testing Machine—or put it another way, it took 3 $\frac{1}{2}$  tons to pull a  $\frac{1}{4}$ " "Unbrako" apart.

Free samples—Complete stocks. Sold by Dealers Everywhere.

**STANDARD PRESSED STEEL CO.**  
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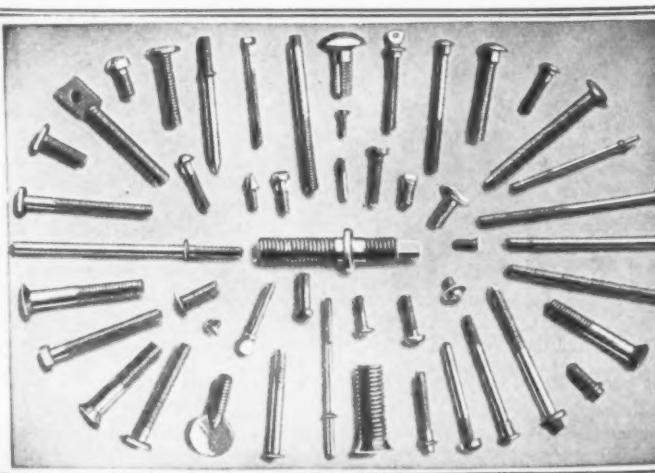


**HEADING SPECIALISTS**

A great many products at present milled from the bar can be developed by our process at a great saving. The illustration shows a variety of products we have developed for other manufacturers by the cold heading process.

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**The Progressive Manufacturing Company**  
TORRINGTON, CONN., U. S. A.  
**IN STOCK AT ALL TIMES**  
Standard Machine Screws  
Machine Screw Nuts  
Interchangeable bolts and nuts made strictly to A.S.M.E. tolerances.



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POWER grips a shaft; twisting torque racks wheel and lever; disruptive stresses tug at machines. Holding them to steady production is a Hollow Screw—steeled to the task. ALLEN has made it what it is, and initiates the standards of what it will be. Research, test, dynamic development—continuous!

*Booklet with sizes and specifications.*

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**Reed and Prince Products include:**

Wood Screws  
Machine Screws  
Cap Screws  
Set Screws  
Stove Bolts  
Sink Bolts  
Hanger Bolts  
Machine Screw Nuts  
Stove Bolt Nuts  
Chair Rods  
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Specialties

Available in any finish — nickel, blued, copper, bronze, brass, galvanized, plain, polished, cadmium, chromium.

**Reed & Prince Screw Products** can be depended upon for unvarying uniformity in strength, finish and dimensions. Every Screw, Nut and Bolt meets the highest standards of quality and accuracy.

**For GOOD WORK use dependable Reed & Prince Products. Your largest requirements can be handled promptly. May we submit samples and prices.**

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WORCESTER, MASS., U.S.A.  
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Wood Screws  
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Coach Screws  
Machine Screws  
Set Screws  
Cap Screws  
Thumb Screws  
Special Automatic Screw  
Machine Products  
Stove Bolts  
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SAE Plain Nuts  
Jack Chain  
Plumber's Chain  
Register Chain  
Safety Chain  
Furnace Chain  
Ladder Chain  
Sash Chain  
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Speedometers  
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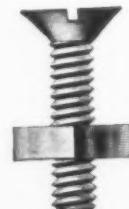
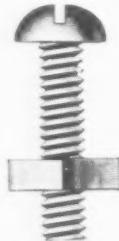


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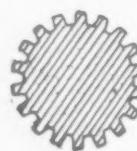
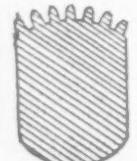
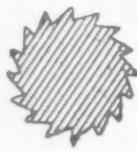
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*The American Hardware Corp., Successor*  
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Don't machine them from solid stock. We will supply you with pinion rods, squares, flats, hexagons and other wire shapes for less money than you could possibly make them.

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Milled from the bar with die-cut threads.  
1/16" to 3". Iron, Steel or Brass.

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Screw Machine Products  
Castle Nuts—Set Screws—Cap Screws

#### SCREW MACHINE PRODUCTS

ACCURATELY MADE AT A FAIR PRICE  
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**FOR  
REAL  
SERVICE  
USE  
CLARK  
BOLTS  
NUTS  
SCREWS  
& RIVETS**

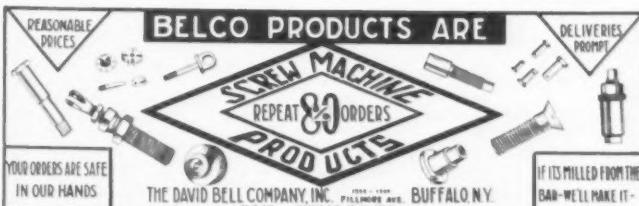
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*Since 1854*  
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CLARK STREET  
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Screw Machine Products  
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The  
Wm. H. Ottemiller Co., Inc.  
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North Tonawanda, N. Y.

BOLTS, NUTS, LAG SCREWS  
STEEL BARS, WIRE

*of exceptional quality*

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EST. 1859

**SPIKES**

TRACK, BOAT  
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FACTORY & OFFICE  
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IRON  
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STANDARD and SPECIAL  
**NUTS**  
MILLED FROM BAR  
WESTFIELD NUT COMPANY

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Formerly made by  
Thomas  
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We carry a large stock and variety of  
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thumb screws, threaded and blank.

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THE synonym for dependability in bolts, nuts and rivets the world over—as indicative of quality as sterling is to users of fine silverware—backed by the pride of one of America's pioneer bolt and nut manufacturers.

Every detail in the manufacture of Oliver Bolts is one of the most exacting care even to the wrapping, packing and shipping. Every package or carton contains a full count—every box is tightly packed for proper shipment—every keg is filled to capacity. Even the labeling of each box or carton has been especially selected to assure maximum visibility in the darkest warehouse.

Such are the little details that make "Oliver Pittsburgh" stand for everything that's great in the world of bolts and nuts.

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Corporation  
PITTSBURGH, PA.**

*Sales Offices:*

New York	Kansas City	Dallas	Chicago
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# RHODE ISLAND TOOL COMPANY

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SCREW MACHINE PRODUCTS  
DROP FORGINGS

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PROVIDENCE - - - RHODE ISLAND



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*True Tolerance*  
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WE MANUFACTURE  
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**MILWAUKEE  
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Established 1887  
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Special Rivets and Washers of Brass,  
Bronze, Copper and Nickel Silver

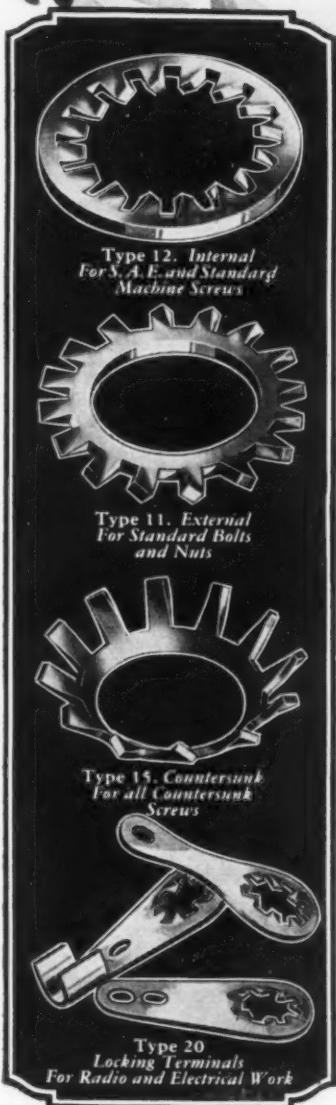
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## SHAKEPROOF

LEADING manufacturers in hundreds of industries have solved their locking problems by using Shakeproof on their products. Better performance, fewer customer complaints and reduced service costs have proved that Shakeproof Lock Washers are a real contribution to industrial progress.

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*Lock Washer Company*

{Division of Illinois Tool Works}  
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**WROUGHT WASHER CO.**

Washers  
Standard and  
special shapes  
and sizes.  
Any quantity.

You will find  
our service a  
source of great  
satisfaction in  
the prompt  
supply of washers  
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Specialties in wire drawn from Swedes Iron, Bessemer, Open Hearth and Crucible Cast Steel.

*Special Wires from Carbon Steels of Particular Analyses*

ESTABLISHED IN 1857

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IRON AND STEEL BARS  
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THE WEBB WIRE WORKS  
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of all descriptions—  
Flat or round. Let us quote you  
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Manufacturers of

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all metals.



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A BETTER WIRE CLOTH  
for all industrial purposes. Prices and information on request.

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Spring wire - Fence - Welding wire - Plain and Galvanized wire - Strand - Special analysis wire

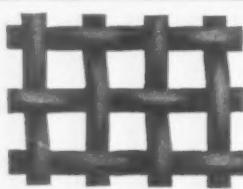
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Pioneers in the manufacture of DOUBLE CRIMP WIRE CLOTH and WIRE SCREENING of every kind possible to weave, made of Steel, Iron, Brass, Copper, Bronze, Aluminum, German Silver, Pure Nickel, Galvanized, Tinned and Monel Wire; also WIRE LATH, etc.

Also drawers of Brass, Copper, Bronze, German Silver, Pure Nickel, Aluminum, Monel Metal Wire, etc.

2117 HOWARD STREET, DETROIT, MICH.

Write for Catalogue No. 25



## We comb the country *.... for this scarce and costly metal!*

TO THE EYE...MERELY SCRAP...an unsightly, tangled mass of metal. Yet we have to shop the country over to find it!

It is one of the several materials used in making acid steel for Roebling "Blue Center" Steel Wire Rope... and is the purest low phosphorus melting stock obtainable...scarce...expensive.

We spend a lot of time searching for this

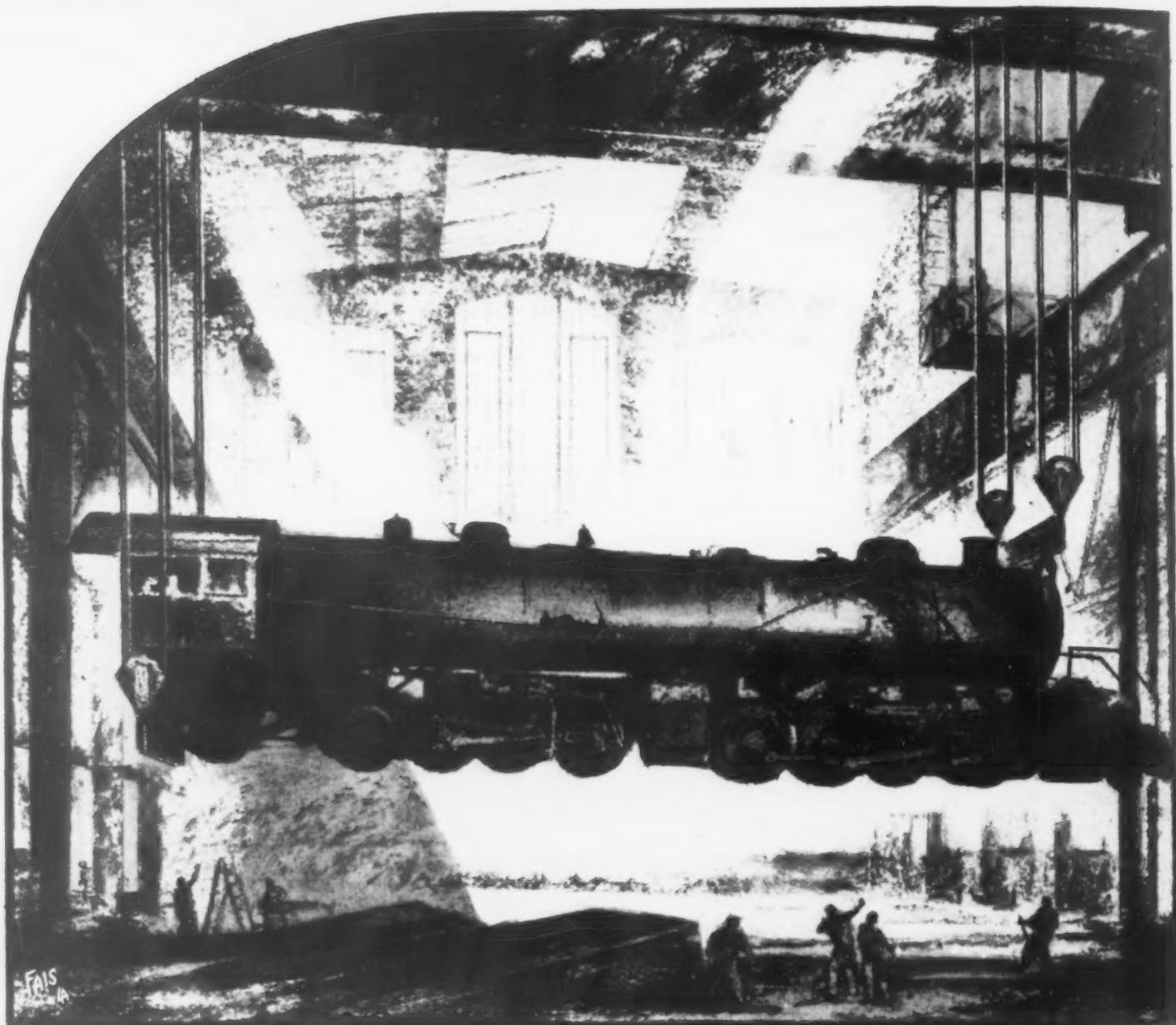
costly metal...and in analyzing it. We also exercise an extraordinary amount of care in selecting other melting stock...the purest of acid open hearth pig, of ore, and of fuel...likewise scarce and expensive ingredients.

It takes more time and patience...this old-fashioned thoroughness...this close attention to details. *But it produces Roebling Wire Rope!*

# ROEBLING



# WIRE ROPE



## Where *safety* is paramount!

HOISTING AND LOWERING gigantic locomotives, each weighing several hundred tons, is a job on which no chances can be taken. A fortune is tied up in this costly equipment. Safety is paramount.

In rigging the Niles Locomotive Crane shown, installed in the shop of a southern railroad, the makers therefore left no stone unturned to assure its dependability. Only the most reliable of equipment was chosen . . .

**ROEBLING**



including Roebling "Blue Center" Steel Wire Rope.

Throughout the Roebling mills, in every operation from "open hearth" to "reel", old-fashioned thoroughness is, and always has been the watchword. It supplements modern methods of production and adds that extra measure of service for which Roebling "Blue Center" Steel Wire Rope is noted.

**JOHN A. ROEBLING'S SONS COMPANY**  
WIRE . . . WIRE ROPE . . . WELDING WIRE . . . FLAT WIRE  
COPPER and INSULATED WIRES AND CABLES  
TRENTON, N.J. Branches in Principal Cities

**WIRE ROPE**

# WASHBURN Wire

Piano Wire      Phonograph Needle Wire  
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 Cast Steel Wire      Round Spring Wire  
 Rope Wire      Clock and Motor Springs  
 Cold Rolled Strip, 3" and narrower  
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**WASHBURN WIRE CO., INC.**  
118th St. & Harlem River      New York, N.Y.

## SPECIAL WIRE CLOTH

We produce special wire cloth for automobile oil, gas and air filters, wire netting for closed car tops and delivery bodies, and also special wire cloth for any other industry. Write us your specifications.

We also make Gray-Wick, Cortland, Wickwire Premier, Wickwire Bronze, Wickwire copper screen wire cloths, poultry netting and fencing, and hardware wire cloth.

Write your jobber for full information and prices.

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One part exactly like another  
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 —that makes for fast  
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 You get them with  
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 wire parts.

Staples,  
wire forms  
of all kinds.

**E.H.TITCHENER & CO.**  
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## An Efficient Wire Rope for Heavy Duty



REG. U.S. PAT. OFF.

IT CAN BE RECOGNIZED BY ITS ONE RED STRAND, WHICH IS ALSO OUR GUARANTEE THAT ITS  
EXCEPTIONAL QUALITY IS CONSTANTLY MAINTAINED

Made only by

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Purchased repeatedly by shrewd buyers on the good old principle: "The best is the cheapest in the end."

BRODERICK & BASCOM ROPE CO.  
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# Yellow Strand WIRE ROPE

## LEE-BUILT SPRINGS



All Sizes

LEE SPRING COMPANY, Inc.

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**WIRE  
SHAPES**  
of Every Kind

Hindley Mfg. Co., Valley Falls, R. I., U. S. A.

**HUNTER**  
SPRINGS Any Type  
Any Metal  
HUNTER PRESSED STEEL CO.  
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COILED  
AND FLAT  
SPRINGS AND  
WIRE FORMS  
OF ALL KINDS

THE CLEVELAND WIRE SPRING CO.  
CLEVELAND, OHIO

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SPRINGS and WIRE SHAPES  
THE CUYAHOGA SPRING CO.  
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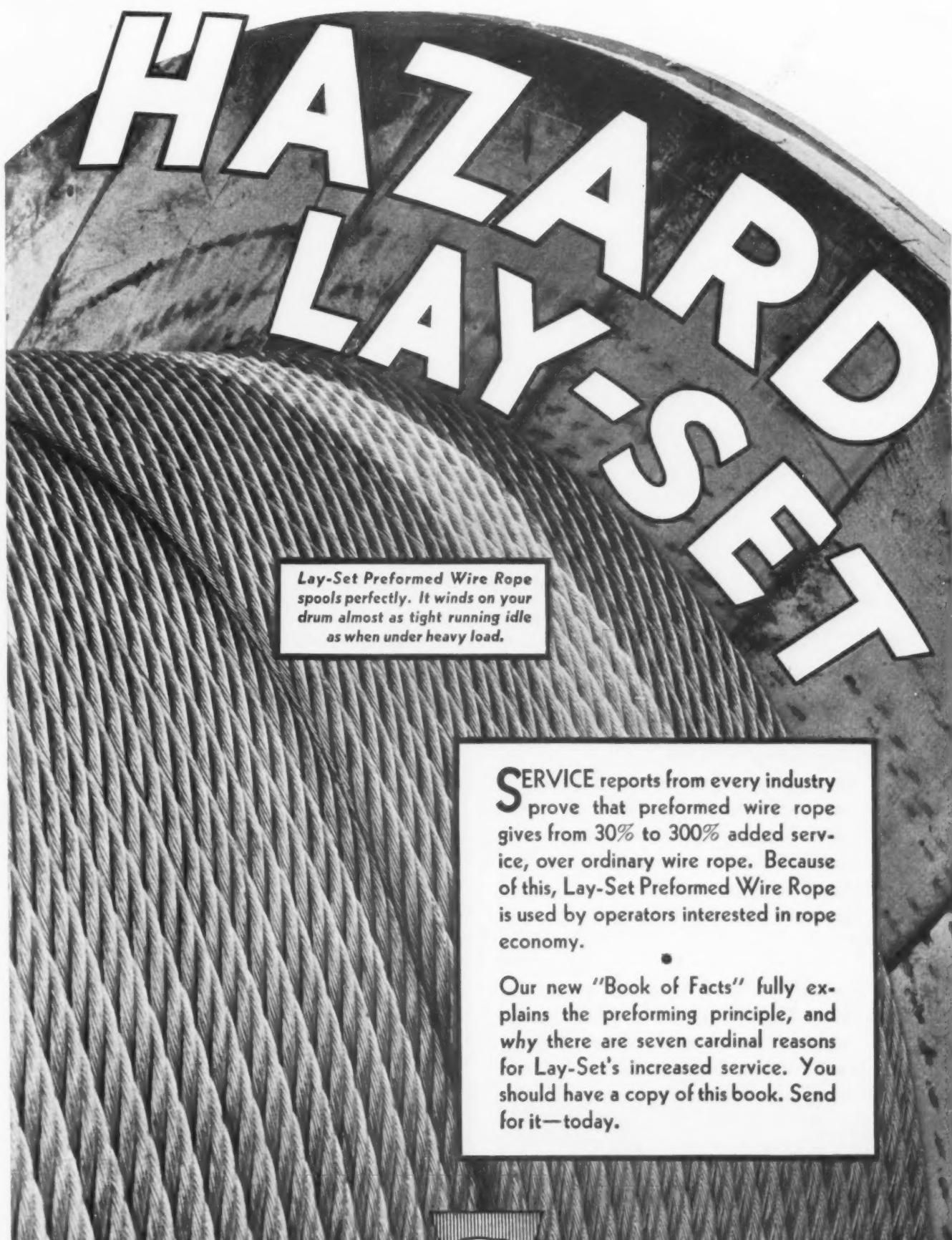
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SOUTH SAGINAW AND JESSIE STREETS  
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ESTABLISHED 1905

COILED and FLAT SPRINGS  
(Phosphor Bronze Springs a Specialty)  
WELCH EXPANSION PLUGS  
(For Closing Core Holes)

SPECIAL WIRE SHAPES SMALL STAMPINGS  
WASHERS and SPRING COTTERS  
Send blue prints or samples for estimates.  
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WELCH EXPANSION PLUG



SERVICE reports from every industry prove that preformed wire rope gives from 30% to 300% added service, over ordinary wire rope. Because of this, Lay-Set Preformed Wire Rope is used by operators interested in rope economy.

Our new "Book of Facts" fully explains the preforming principle, and why there are seven cardinal reasons for Lay-Set's increased service. You should have a copy of this book. Send for it—today.

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**Flat and Coiled and Wire Forms**

**American Spring & Mfg. Corp.**  
Holly Michigan

Light and Heavy Dependable

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WE lay stress, not so much upon our modern automatic machines and appliances, but more particularly upon the knowledge gained by 37 years' experience in designing and manufacturing an infinite variety of springs, which, because of their design, heat treatment and uniform accuracy, invariably function properly in the products for which they are made.

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What are your requirements?

AMERICAN SPIRAL SPRING & MFG. CO.  
Established 1887  
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MILLER & VAN WINKLE, INC.



**“SPRINGS”** PROPERLY-MADE  
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**THE CHAS. FISCHER SPRING COMPANY**

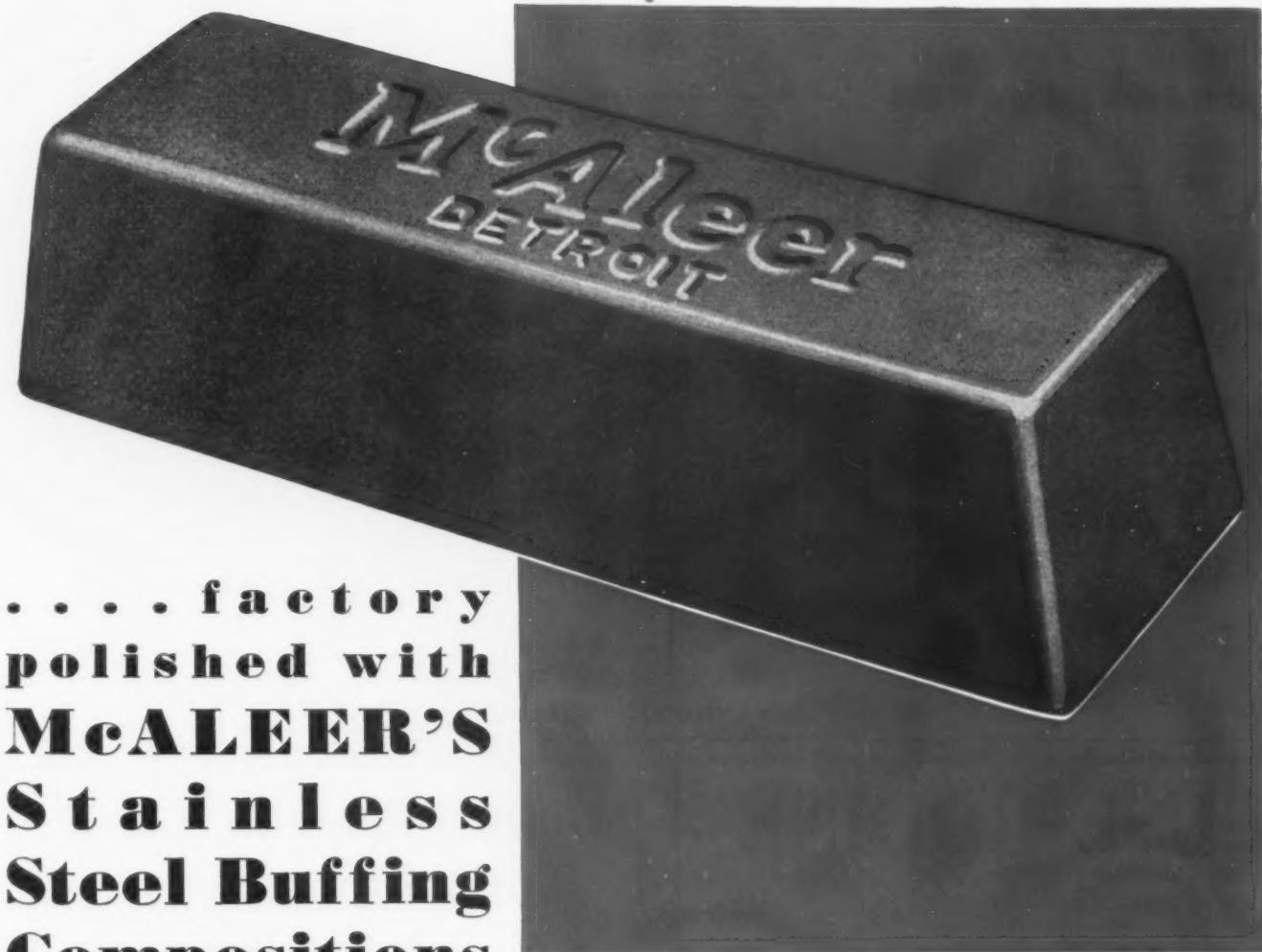
Round and Flat Springs, Wire Forms, Flexible Shafts and Tubing, complete Mechanical Assemblies

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# AUTOMOBILE LAMPS AND RADIATOR SHELLS



. . . . factory  
polished with  
**McALEER'S**  
**S t a i n l e s s**  
**Steel Buffing**  
**Compositions**

For giving a brilliant, permanent polish to stainless steel or rustless iron, nothing is quite so satisfactory as McAleer's Stainless Steel Buffing Compositions.

The fact that the country's most prominent automobile and parts manufacturers use these new products in ever-increasing quantities is conclusive

evidence of their ability to do the job quickly and economically.

McAleer's Stainless Steel Buffing Compositions are available in three grades: No. 6, medium dry, for small parts; No. 7, medium greasy, for flat parts; and No. 7-F-170 (new development), for miscellaneous work. In requesting samples, please specify which compositions are desired.

**JOBBERS  
WANTED!**

**McALEER  
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in production is the result of each factor which contributes to the dependable performance of every production operation. Cleaning operations when performed with the use of the



are one of the most dependable units of a production schedule. This is because these unusual cleaners are so efficient in their action, and so dependable and uniform in quality that they turn out "chemically clean" metal at a speed which meets the most exacting schedule. By placing an order for Wyandotte Metal Cleaners you also reduce your rejections to a minimum.

**THE J. B. FORD CO.**

*Sole Mfrs.*

**WYANDOTTE, MICHIGAN**



Ask your  
supply man  
for  
"WYANDOTTE"

## USE RODINE for PICKLING

*And Save at Least 30 Cts. Per Ton*

**AMERICAN CHEMICAL PAINT CO.**

**AMBLER, PA.**

### CHAMPION 401 STEEL RIVET FORGE

Made with ad-  
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Bearings only.

Capacity 4"  
round iron in 10  
minutes.

Hearth, 18  
inches in diam-  
eter.

Fan Case, 9  
inches in diam-  
eter.

Turns Easy  
Lasts Longer



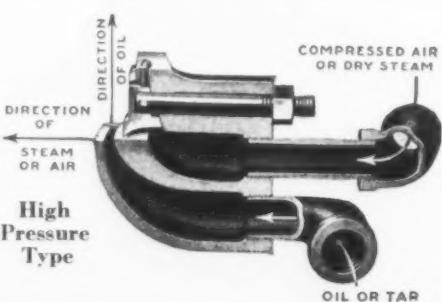
*Over a Million  
in Use*

Write for No.  
55 Catalogue on  
Blowers, Forges,  
Drills, Lathes,  
Grinders, Hack  
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CHAMPION BLOWER AND FORGE CO.—LANCASTER, PA.

## Gives a flame to fit any firebox

**W. N. BEST Oil Burners**

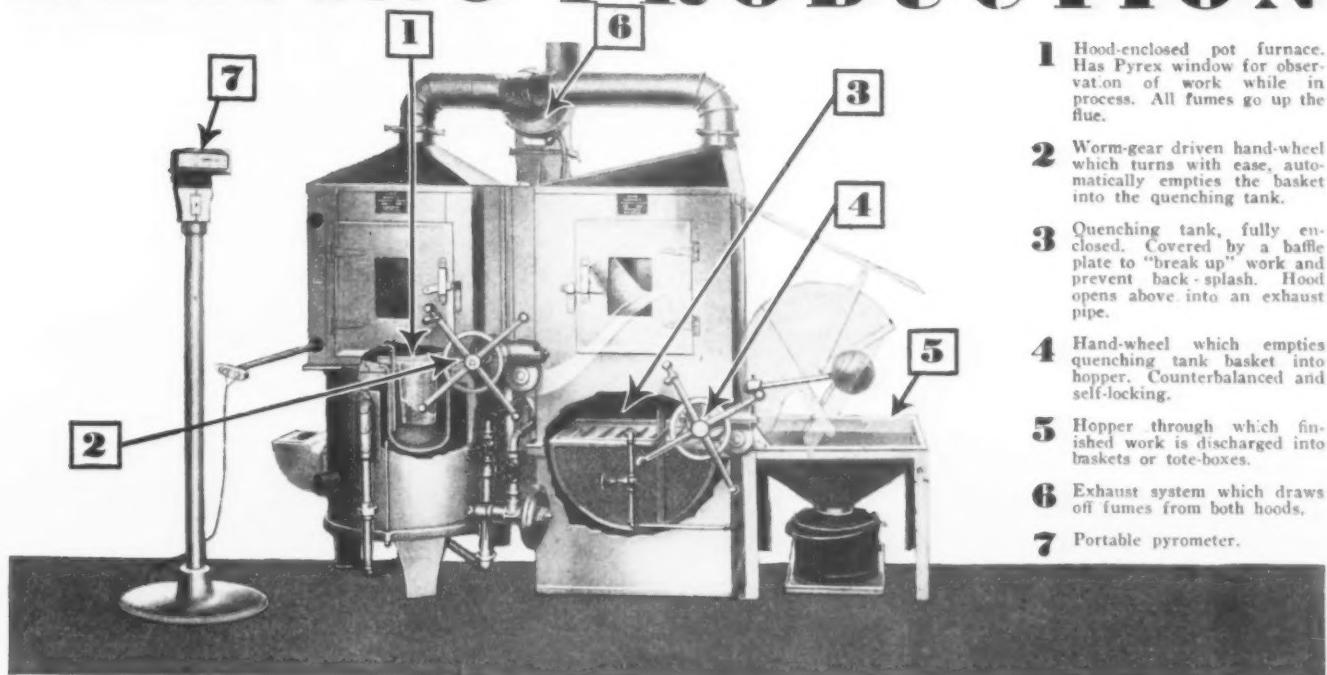


The W. N. BEST Oil Burner is filed, fitted and tested to insure proper flame performance for each application. There are no internal parts or needle points to clog, and the burner is always clean. Regulation of the flame is very simple and assures great economy in operation.

*Let us give you the benefit of thirty-nine years'  
experience in Liquid Fuel Combustion.  
Catalog on request.*

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# RAISING PRODUCTION



**1** Hood-enclosed pot furnace. Has Pyrex window for observation of work while in process. All fumes go up the flue.

**2** Worm-gear driven hand-wheel which turns with ease, automatically empties the basket into the quenching tank.

**3** Quenching tank, fully enclosed. Covered by a baffle plate to "break up" work and prevent back-splash. Hood opens above into an exhaust pipe.

**4** Hand-wheel which empties quenching tank basket into hopper. Counterbalanced and self-locking.

**5** Hopper through which finished work is discharged into baskets or tote-boxes.

**6** Exhaust system which draws off fumes from both hoods.

**7** Portable pyrometer.

## *in the Hardening Department*

**T**HE new Hyro Automatic Pot Furnace definitely increases production in the hardening department. But that is only one of its advantages. Here are some others:

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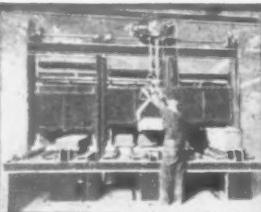
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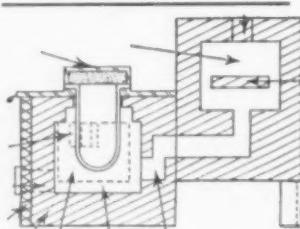
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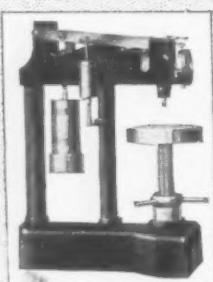


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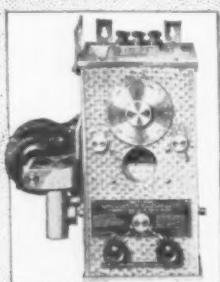


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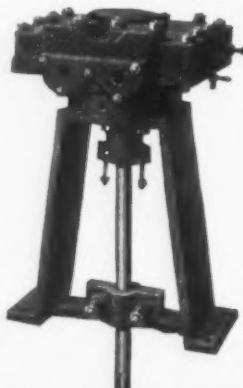
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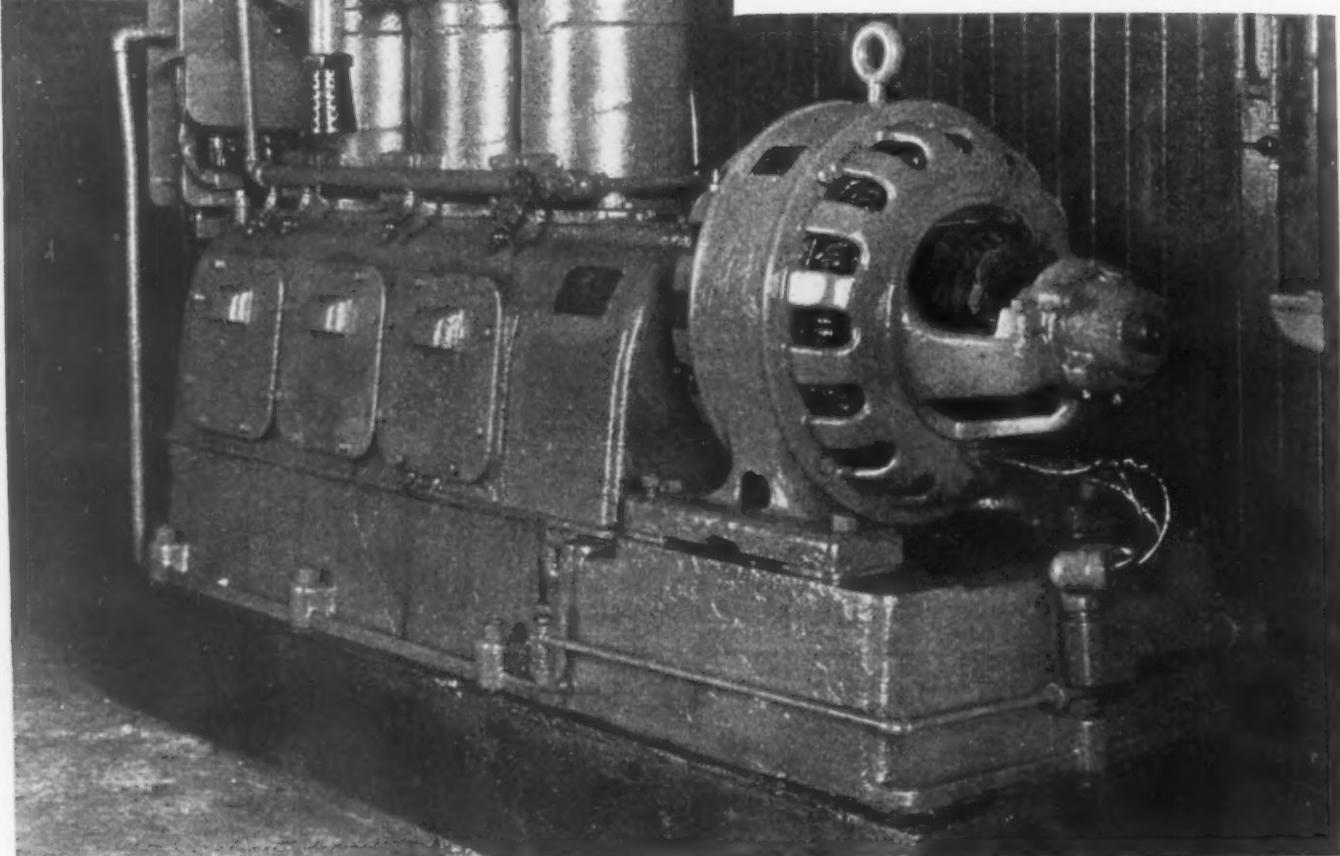
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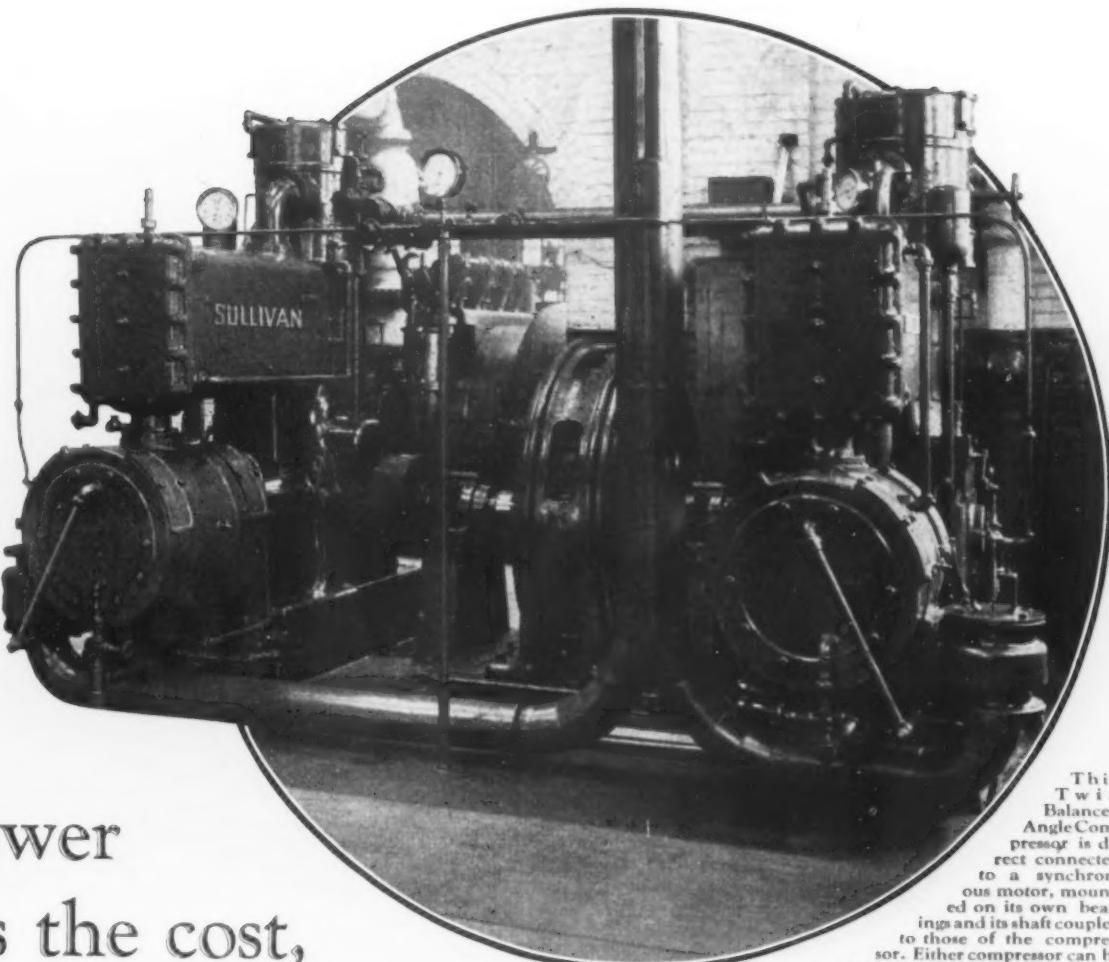


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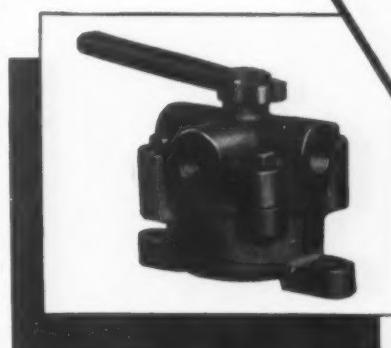
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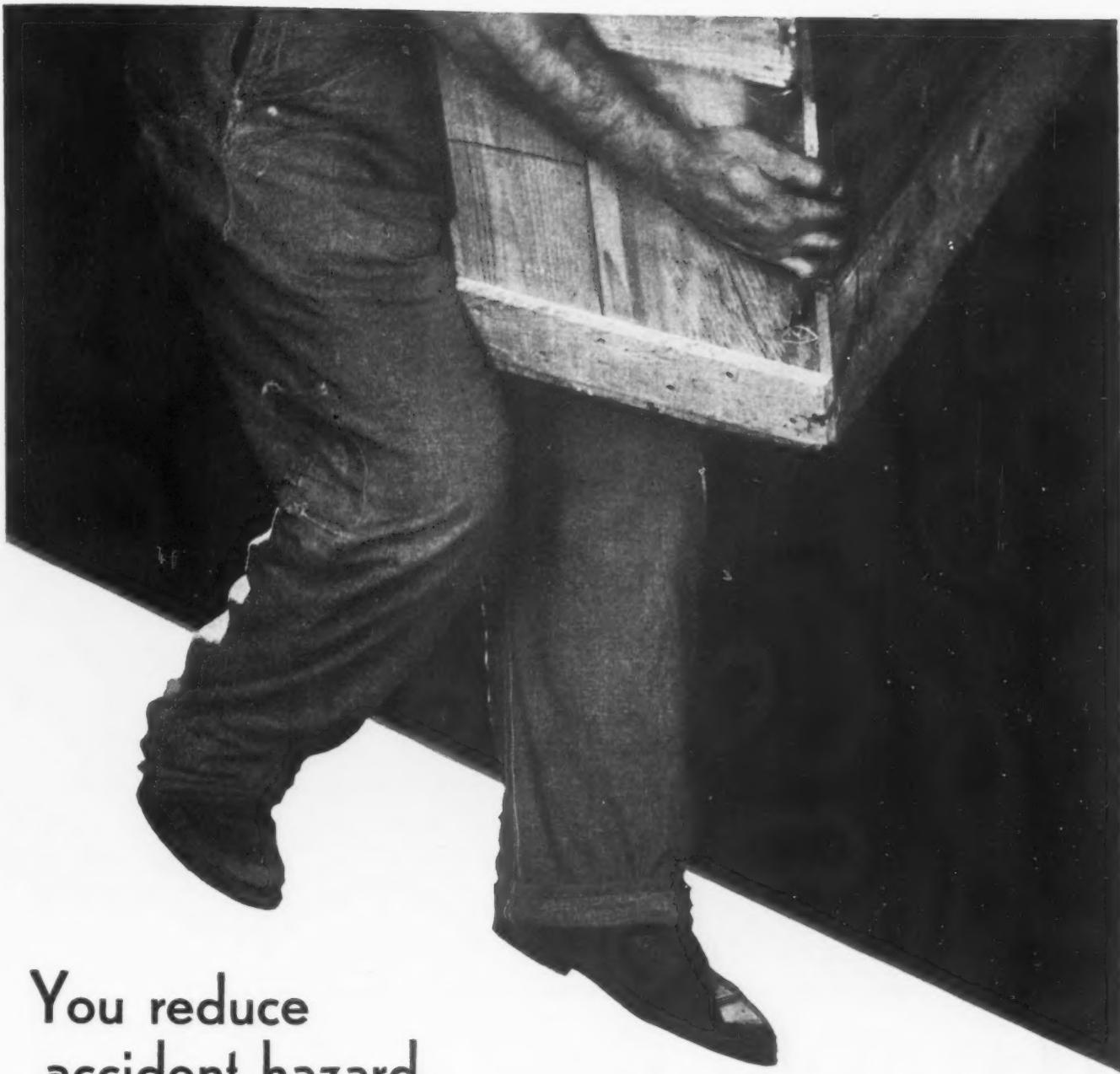
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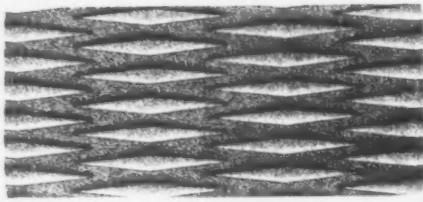
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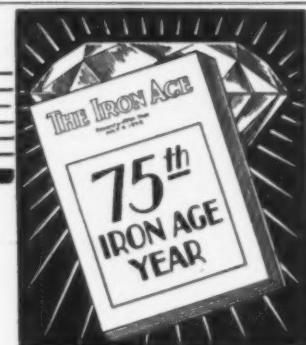
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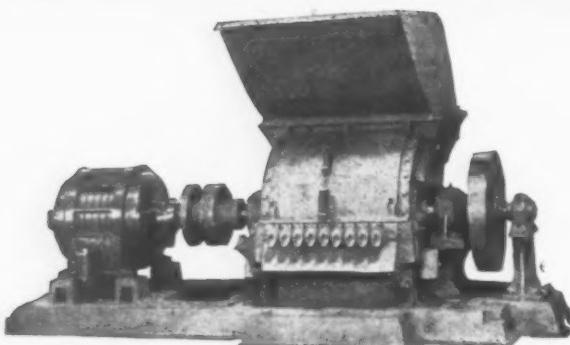
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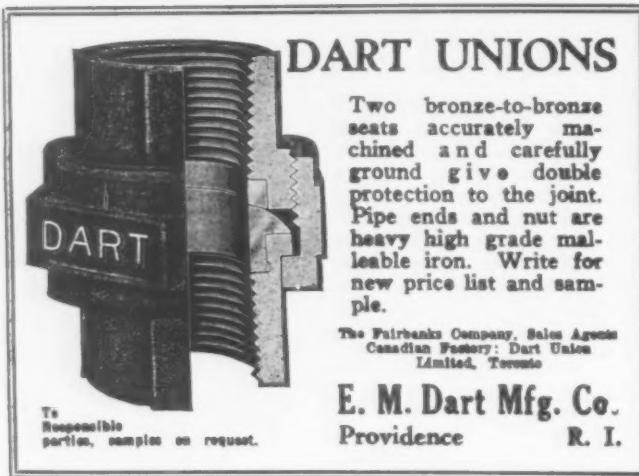
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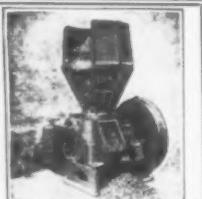
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Press, S.S., S.C., B.G., Phila., 3½" str., 7000 lbs.

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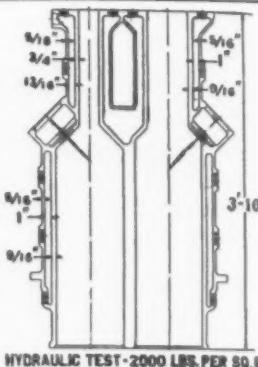
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Charcoal "Mayari" and low phosph. mixtures.  
Quality castings for machinery, blank gears,  
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Capacity 16,000 lbs. per day

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Superior quality, machine or hand moulded, sand  
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COMPRIsing: VALUABLE LAND AND BUILDINGS ON DELAWARE RIVER, 350 FT. WHARF; 14,600 LINEAL FEET OF RAILROAD SIDINGS, SERVED BY PENNSYLVANIA RAILROAD.

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A well established Chicago corporation manufacturing machinery, tools and metal specialties made an actual profit of over \$100,000 last year, most of which went into additional equipment and promotion of the business. We now wish to increase our working capital slightly, and offer to five mechanical executives who can reciprocate, and who have \$2,000 each, an interest in this business. **ADDRESS BOX G-463.** Care The Iron Age, 239 W. 39th St., New York.

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Must be able to produce results. Territory, New York, Pennsylvania, New England.

Reply stating qualifications, past experience and territory you are traveling.

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We are looking for patented specialties of sheet metal to manufacture. We solicit inquiries from inventors or sales organizations. Facilities unusually complete. Our Engineering Department is at your service.

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Why not give us an opportunity to manufacture for you, until your requirements warrant a separate Plant investment?

We have excess manufacturing capacity. HAMILTON, Ontario, where we are located, enjoys exceptional distributive facilities.

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APPRaisALS**

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TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., September 17, 1930.—SEALED BIDS will be opened in this office at 3 p. m., October 29, 1930, for the annex, extension and remodeling (except elevators) of the U. S. post office, court house, etc., at Albuquerque, N. Mex. Drawings and specifications, not exceeding six sets, may be obtained at this office in the discretion of the supervising architect by any satisfactory general contractor, and provided a deposit of \$50.00 is made for each set to assure its prompt return. Checks offered as deposits must be made payable to the order of the Treasurer of the United States. JAS. A. WETMORE, Acting Supervising Architect.

**ALL KINDS**  
*of Opportunities  
are Presented*

**HERE**

It has become a habit with executives in the metal trades field to turn to this section for opportunities in business, capital, industrial real estate, inventions, new products. This is the habit which makes these pages effective for your purposes. You will find their cost low.

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THEM**

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**SUPERINTENDENT or GENERAL FOREMAN**, with experience in sheet metal layout and fabrication. Must be able to take entire charge of shop from the layout from drawings to the production of the finished article. Record of results necessary, which please state with experience and salary wanted in first letter. Position available immediately. Address Box G-517, care *The Iron Age*, 239 W. 39th St., New York.

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**SALESMEN** on commission basis only to sell the Guibert Togglebug Drill. Prefer men selling tools or machinery to structural fabricators. Prefer men in cities Los Angeles, San Francisco, Seattle, Portland, Memphis, Kansas City, Dallas and the South. Address Guibert Steel Company, P. O. Box 1037, Pittsburgh, Pa.

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A Personnel Agency  
20 W. JACKSON BLVD., CHICAGO, ILL.  
17 Years of Employment Service Experience

## EMPLOYMENT SERVICE

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POSITIONS in all branches of the Iron, Steel and Allied Industries may be obtained through our efficient Employment Service. *Personnel Extension Bureau*, 917 Equitable Bldg., Baltimore, Md.

## SITUATIONS WANTED

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**ASSISTANT CHIEF CHEMIST** or Steel Analyst; 30 years of age; married. Ten years' experience in inspection, sampling and analysis of alloy and plain carbon steels, scrap, refractories, pig iron, coke and steel works materials in general. Now employed. Best references. Address Box C-980, care of *The Iron Age*, 1362 Hanna Bldg., Cleveland, Ohio.

**SALES EXECUTIVE OR GENERAL SALES MANAGER**—39, broad technical, shop and engineering experience. Eight years as director of sales and machine tool salesman for concern of national scope. Central West preferred. Address Box G-499, care *The Iron Age*, 239 W. 39th St., New York.

**SALESMAN OF EXPERIENCE** and executive ability located in the Metropolitan District, would represent reputable manufacturer of staple products. Address Box G-471, care *The Iron Age*, 239 West 39th St., New York.

**EXECUTIVE ACCOUNTANT**—Desires connection with manufacturing concern. Familiar with corporate control. Can take full charge of all financial and accounting details including costs and budgetary control. Box C-979, care *The Iron Age*, 1362 Hanna Bldg., Cleveland, O.

**STEEL MELTER**, not employed at present, experienced in Open Hearth and Electric Furnaces. Good references. Address Box G-472, care *The Iron Age*, 239 W. 39th St., New York.

**EXPERIENCED SALES EXECUTIVE** would like to represent Eastern firm in Washington and Oregon. Address Box G-473, care *The Iron Age*, 239 West 39th St., New York.

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### SITUATIONS WANTED

YOUNG MARRIED MAN desires to make connection with a reliable concern, capacity, Sales Representative, making headquarters in Syracuse, N. Y. Nine years sales engineering experience. Commission basis with drawing account desirable. Address Box G-524, care *The Iron Age*, 239 W. 39th St., New York.

### SITUATIONS WANTED

MANAGER OR SUPERINTENDENT, wide and varied experience covering supervision and management of all departments in connection with a manufacturing concern. Practical and Technical training with clean record of results. Address Box G-528, care *The Iron Age*, 239 W. 39th St., New York.

# Something of interest to you in the Classified Sections

Production executives, engineers, salesmen, used machinery, surplus materials, industrial real estate, contract work facilities, business opportunities, etc.—all these are advertised in the Classified Sections. See pages preceding Products Index. . . . .

# The Classified Sections of THE IRON AGE

#### Help Wanted Rates

Set solid, minimum 50 words.....	\$3.00
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All capitals, leaded, minimum 50 words....	\$6.00
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#### Situations Wanted Rates

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# Products Index

- ABRASIVE WHEELS**—See Grinding Wheels
- ABRASIVES**  
Panborn Corp., Hagerstown, Md.  
Patch-Wegner Co., Rutland, Vt.
- ACCUMULATORS**—Hydraulic  
Elmes, Chas. F., Engrg. Works, Chicago,  
Lake Erie Engng. Corp., Buffalo, N. Y.  
Southwark Fdry. & Mach. Co., Phila.  
Watson-Stillman Co., 71 West St., N. Y.C.  
Wood, R. D., & Co., Philadelphia.
- ACETYLENE**—Dissolved In Cylinders  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
- ACIDS**—Pickling  
American Chemical Paint Co., Ambler, Pa.
- AIR TANKS AND CYLINDERS**  
Air-Tight Steel Tank Co., Pittsburgh.  
Janney, Joseph A., Jr., Phila.  
Scalfi, William B., & Sons Co., Pittsburgh.
- ALLOYS**—Calcium-Silicon  
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
- ALLOYS**—Phosphor Bronze  
Phosphor Bronze Smelting Co., Phila.
- ALLOYS**—Silico-Manganese  
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
- ALLOYS**—Titanium  
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
- ALLOYS**—Tungsten  
Vanadium Corp. of America, 120 B'way, New York City.
- ALLOYS**—Vanadium  
Vanadium Corp. of America, 120 B'way, New York City.
- ALUMINUM**  
Rogers Brown & Crocker Bros., Inc., 21 East 40th St., N. Y. C.
- AMMONIA RECOVERY PLANTS**  
Koppers Construction Co., The, Pittsburgh.
- ANGLES, BEAMS, CHANNELS AND TEES**  
Bethlehem (Pa.) Steel Company  
Carnegie Steel Co., Pittsburgh  
Illinoian Steel Warehouse Co., Chicago  
Inland Steel Co., Chicago.  
Jones & Laughlin Steel Corp., Pittsburgh.  
Phoenix Iron Co., Phila.  
Republic Steel Corp., Youngstown, Ohio.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Scullin Steel Co., St. Louis, Mo.
- ANNEALING**—See Heat Treating
- ANODES**  
Meeker Co., The, Chicago.
- ANVILS**  
Atkins, E. C., & Co., Indianapolis, Ind.  
West Steel Casting Co., The, Cleveland.
- APPRAISERS**  
Standard Appraisal Co., 6 Church St., N. Y. C.
- ARBORS**  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Whitman & Barnes, Inc., Detroit, Mich.
- ARMORING MACHINES**—Wire, Cable, Hose, Etc.  
Sleeper & Hartley, Inc., Worcester, Mass.
- ARRESTERS**—Spark  
Harrington & King Perforating Co., Chi.
- AXLES**—Car or Locomotive  
Bethlehem (Pa.) Steel Company.  
Carnegie Steel Co., Pittsburgh.
- BABBITT METAL**  
Ryerson, Jos. T., & Son, Inc., Chicago.
- BAFFLE WALLS**  
Johns-Manville Corp., 292 Madison Ave., New York City.
- BALING PRESSES**—Hydraulic  
Galland-Henning Mfg. Co., Milwaukee.
- BALING PRESSES**—Scrap Metal  
Galland-Henning Mfg. Co., Milwaukee.
- BALLS**—Burnishing  
Abbott Ball Co., 1047 New Britain Ave., Hartford, Conn.
- BALLS**—Forged Chrome Steel for Galvanizing  
Philadelphia (Pa.) Steel & Iron Co.
- BALLS**—Steel, Brass or Bronze  
Abbott Ball Co., 1047 New Britain Ave., Hartford, Conn.  
Auburn Ball Bearing Co., Rochester, N. Y.  
New Departure Mfg. Co., Bristol, Ct.
- BANDS**—Steel  
Akron-Selle Co., Akron, Ohio.  
Bethlehem (Pa.) Steel Company  
Republic Steel Corp., Youngstown, Ohio.
- BARRELS**—Burnishing  
Abbott Ball Co., 1047 New Britain Ave., Hartford, Conn.  
Baird Machine Co., Bridgeport, Conn.  
Globe Mach. & Stg. Co., Cleveland  
Ranshoff, N. Inc., Cincinnati, Ohio.
- BARRELS**—Plating  
Meeker Co., The, Chicago.
- BARRELS**—Steel Shop  
Cleveland (O.) Wire Spring Co.
- BARRELS**—Tumbling—See Tumbling Barrels
- BARS**—Alloy  
Bethlehem (Pa.) Steel Co.  
Republic Steel Corp., Youngstown, Ohio.
- BARS**—Cast Bronze  
Buckeye Brass & Mfg. Co., Cleveland.
- BARS**—Concrete, Reinforcing  
Laclede Steel Co., St. Louis, Mo.  
Metcalf Plate Washer Co., Inc., Phila.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Scullin Steel Co., St. Louis, Mo.
- BARS**—Manganese Steel  
Manganese Steel Forge Co., Phila.
- BARS**—Steel  
Ames, W. & Co., Jersey City, N. J.  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Co.  
Carnegie Steel Co., Pittsburgh.  
Illinoian Steel Warehouse Co., Chicago.  
Inland Steel Co., Chicago.  
Philadelphia (Pa.) Steel & Iron Co.  
Republic Steel Corp., Youngstown, Ohio.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Scullin Steel Co., St. Louis, Mo.
- BASKETS**—Pickling  
Bresse Bros. Co., Cincinnati.
- BATTERY CHARGERS**  
Cutler-Hammer, Inc., Milwaukee.
- BEAMS**—See Angles, Beams, Channels and Tees.
- BEARING METAL**  
Bunting Brass & Bronze Co., Toledo.  
Frederickson Company, Saginaw, Mich.
- BEARINGS**—Babbitt  
Bunting Brass & Bronze Co., Toledo.
- BEARINGS**—Ball  
American Roller Bearing Co., Pittsburgh.  
Auburn Ball Bearing Co., Rochester, N. Y.  
Bantam Ball Bearing Co., South Bend, Ind.  
New Departure Mfg. Co., Bristol, Ct.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Standard Machinery Co., Auburn, R. I.
- BEARINGS**—Brass and Bronze  
American Manganese Bronze Co., Phila.  
Buckeye Brass & Mfg. Co., Cleveland.  
Bunting Brass & Bronze Co., Toledo, O.  
Erie (Pa.) Bronze Co.  
Frederickson Company, Saginaw, Mich.  
Lumen Bearing Co., Buffalo, N. Y.
- BEARINGS**—Oilless  
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
- BEARINGS**—Radial  
Bantam Ball Bearing Co., South Bend, Ind.
- BEARINGS**—Roller  
American Roller Bearing Co., Pittsburgh.  
Bantam Ball Bearing Co., South Bend, Ind.  
Rollway Bearing Co., Inc., Syracuse, N. Y.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Standard Machinery Co., Auburn, R. I.  
Timken Roller Bearing Co., Canton, Ohio.
- BEARINGS**—ROLLER TAPERED  
Timken Roller Bearing Co., Canton, Ohio.
- BEARINGS**—Thrust  
Bantam Ball Bearing Co., South Bend, Ind.  
Rollway Bearing Co., Inc., Syracuse, N. Y.  
Standard Mfg. Co., Auburn, R. I.  
Timken Roller Bearing Co., Canton, O.
- BELT DRESSING**  
Graton & Knight Co., Worcester, Mass.
- BELT FASTENERS**  
Smith, F. P., & Co., Sharon Hills, Pa.
- BELT LACING**  
Graton & Knight Co., Worcester, Mass.
- BELTING**—Cement  
Graton & Knight Co., Worcester, Mass.
- BELTING**—Conveyor  
New York Belting & Packing Co., 91-93 Chambers St., N. Y. C.
- BELTING**—Leather  
Chicago (Ill.) Rawhide Mfg. Co., 1313 Elston Ave.  
Graton & Knight Co., Worcester, Mass.
- BELTING**—Leather Link  
Graton & Knight Co., Worcester, Mass.
- BELTING**—Rubber  
New York Belting & Packing Co., 91-93 Chambers St., N. Y. C.
- BENCHES AND TABLES**—Steel  
Standard Pressed Steel Co., Jenkintown, Pa.
- BENCHES**—Draw—See Wire Drawing Machinery
- BENDING MACHINES**—Angle or I-Bands  
Buffalo (N. Y.) Forge Co., 492 B'way.  
Galland-Henning Mfg. Co., Milwaukee.  
Smith, David H., & Sons, Inc., Foot of 51st St., Brooklyn, N. Y.  
Thomas Spacing Mach. Co., Pittsburgh.
- BENDING MACHINES**, BAR—Circle or Spiral  
Kardong Bros., Inc., Minneapolis, Minn.
- BENDING MACHINES**—Hand and Power  
American Pipe Bending Mch. Co., Boston.  
Buffalo (N. Y.) Forge Co., 492 B'way.  
Cincinnati (O.) Shaper Co., The.  
Cleveland (O.) Punch & Shear Wks. Co.  
Dreis & Krump Mfg. Co., Chicago.  
Kane & Roach, Syracuse, N. Y.  
Pels, Henry, & Co., 90 West St., N. Y. C.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Yoder Co., The, Cleveland, O.
- BENZOL RECOVERY PLANTS**  
Koppers Construction Co., The, Pittsburgh.
- BILLET GOUGERS & PEELERS**  
Manning, Maxwell & Moore, Inc., 100 E. 42nd Street, N. Y. C.
- BILLETS**—Alloy Steel  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Co.
- BILLETS**—Carbon Steel  
Andrews Steel Co., The, Newport, Ky.
- BILLETS**—Carbon Vanadium Steel  
Andrews Steel Co., The, Newport, Ky.
- BILLETS**—Chrome Steel  
Andrews Steel Co., The, Newport, Ky.
- BILLETS**—Chrome Nickel Steel  
Andrews Steel Co., The, Newport, Ky.
- BILLETS**—Die Block Steel  
Andrews Steel Co., The, Newport, Ky.
- BILLETS**—Forging  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Co.  
Central Iron & Steel Co., Harrisburg, Pa.  
Heppenstall Co., Pittsburgh.  
Republic Steel Corp., Youngstown, Ohio.  
Ryerson, Jos. T., & Son, Inc., Chicago.
- BILLETS**—Nickel Steel  
Andrews Steel Co., The, Newport, Ky.  
Republic Steel Corp., Youngstown, Ohio.
- BILLETS**—Re-rolling  
Andrews Steel Co., The, Newport, Ky.
- BLANKS**—Brass and Copper  
Bridgeport (Conn.) Brass Co.
- BLANKS**—Gear & Pinion  
Bethlehem (Pa.) Steel Co.,  
Chicago (Ill.) Rawhide Mfg. Co., 1313 Elston Ave.  
Edgewater Steel Co., Pittsburgh.
- BLAST FURNACE SPECIALTIES**  
Research Corp., 405 Lexington Ave., N. Y. C.
- BLOCKS**—Crossed  
Jennison-Wright Co., Toledo.
- BLOWERS**—Pressure  
Anthony Co., Long Island City, N. Y.  
Buffalo (N. Y.) Forge Co., 492 B'way.  
Champion Blower & Forge Co., Lancaster Pa.
- BLOWERS**—Rotary Positive  
Connerville (Ind.) Blower Co., Inc., The Roots, F. H. & F. M. Co., The, Connerville, Ind.  
Wilbraham-Green Blower Co., Pottstown, Pa.
- BOILER HEADS**—Flanged and Dished  
Bethlehem (Pa.) Steel Co.  
Ryerson, Jos. T., & Son, Inc., Chicago.
- BOILERS**—Return Tubular  
Muskegon (Mich.) Boiler Wks.
- BOILERS**—Waste Heat  
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.  
Frey Engineering Co., Chicago.
- BOILERS**—Water Tube  
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.
- BOLT CUTTERS**  
Acme Mchry. Co., Cleveland, O.  
National Mchry. Co., Tiffin, Ohio.
- BOLT AND NUT MACHINERY**  
Acme Machinery Co., Cleve.  
Economy Engng. Co., The, Willoughby, O.  
Manville, E. J. Mach. Co., Waterbury, Ct.  
National Mchry. Co., Tiffin, Ohio.  
Waterbury (Cl.) Farrel Fury, & Mch. Co.
- BOLT & RIVET CLIPPERS**  
Helwig Mfg. Co., St. Paul, Minn.
- BOLTS**—Carriage & Machine  
Buffalo Bolt Co., N. Tonawanda, N. Y.  
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
- BOLTS**—Special  
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
- BOLTS**—Track  
Inland Steel Co., Chicago.
- BOLTS AND NUTS**  
Ames, W., & Co., Jersey City, N. J.  
Bell, David, Co., Inc., The, Buffalo, N. Y.  
Bethlehem (Pa.) Steel Co.  
Buffalo Bolt Co., N. Tonawanda, N. Y.  
Clark Bros. Bolt Co., Milldale, Conn.  
National Acme Co., The, Cleveland.  
Nedly Nut & Bolt Co., Pittsburgh.  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Reed & Prince Mfg. Co., Worcester, Mass.  
Rhode Island Tool Co., Providence, R. I.  
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.  
Ryerson, Jos. T., & Son, Inc., Chicago.
- BORING, DRILLING AND MILLING MACHINES**—Horizontal  
Barren, W. F., & John Co., Rockford, Ill.  
Defiance (O.) Mch. Wks.  
Hill, Clarke & Co. of Chicago, 647 W. Washington Blvd., Chicago, Ill.  
Lucas Machine Tool Co., Cleve.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Sellers, William, & Co., Inc., Phila.  
Universal Boring Mch. Co., Hudson, Mass.
- BORING & DRILLING MACHINES**—Vertical  
Baker Bros., Inc., Toledo.  
Bullard Co., The, Bridgeport, Ct.  
Consolidated Mch. Tool Corp. of America, Rochester, N. Y.
- BORING BARS**  
Bullard Co., The, Bridgeport, Ct.
- BORING AND TURNING MILLS**—Vertical  
Bullard Co., The, Bridgeport, Ct.  
Sellers, William, & Co., Inc., Phila.
- BOXES**—Annealing  
Blaw-Knox Co., Pittsburgh.  
Petroleum Iron Wks. Co., Sharon, Pa.  
Union Steel Casting Co., Pittsburgh.
- BOXES**—Steel  
Cleveland (O.) Wire Spring Co.
- BRAKES**—Electric  
Clark Controller Co., The, Cleveland, O.  
Cutler-Hammer, Inc., Milwaukee.
- BRAKES**—Metal Forming  
Cincinnati (O.) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.  
Minster (O.) Machines Co.,  
Ohio, Geo. A., & Co., Inc., Newark, N. J.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

( ALL THESE COMPANIES CARRY AN AD IN THIS ISSUE )  
ALPHABETICAL INDEX . . . . . PAGES 214-216 )

**BRECHINGS**

Muskegon (Mich.) Boiler Works

**BRICK—Chrome**General Refractories Co., Philadelphia, Pa.  
Harrison-Walker Refractories Co., Pittsburgh  
Lavino, E. J., & Co., Phila.

Stowe-Fuller Refractories Co., The, Cleve-

**BRICK—Fire Clay**

Bellevue Industrial Furnace Co., Detroit.

Carboneum Co., The, Niagara Falls,

N. Y.

General Refractories Co., Philadelphia, Pa.  
Harrison-Walker Refractories Co., Pittsburgh

Stowe-Fuller Refractories Co., The, Cleve-

**BRICK—Magnesite**

General Refractories Co., Philadelphia, Pa.

Harrison-Walker Refractories Co., Pittsburgh

Lavino, E. J., &amp; Co., Phila.

**BRICK—Silica**

General Refractories Co., Philadelphia, Pa.

Harrison-Walker Refractories Co., Pittsburgh

Lavino, E. J., &amp; Co., Phila.

**BRIDGE BUILDERS**Lakeside Bridge & Steel Co., 103 Villard Ave., Milwaukee, Wis.  
McClintic-Marshall Co., PittsburghPhoenix Iron Co., Phila.  
Shoemaker Bridge Co., Pottstown, Pa.**BRIDGE OPERATING MACHINERY—Movable**

Earle Gear &amp; Mch. Co., Phila.

**BROACHES**

Amer. Broach &amp; Mch. Co., Ann Arbor, Mich.

Lapointe Mch. Tool Co., Hudson, Mass.

**BROACHING MACHINES**

Amer. Broach &amp; Mch. Co., Ann Arbor, Mich.

Lapointe Mch. Tool Co., Hudson, Mass.

**BRONZE—Phosphor**

Phosphor Bronze Smelting Co., Phila.

**BRONZE BAR—Cored and Solid**

Frederickson Company, Saginaw, Mich.

**BUCKETS—Clamshell**

Blaw-Knox Co., Pittsburgh.

Browning Crane Co., The, Cleveland.

Hayward Co., 50 Church St., N. Y. C.

Industrial Brownhoist Corp., Cleveland.

Orton Crane &amp; Shovel Co., Chicago.

Owen Bucket Co., Cleveland.

**BUCKETS—Dragline**

Hanschfeiger Corp., Milwaukee.

**BUCKETS—Electric Motor**

Hayward Co., 50 Church St., N. Y. C.

**BUCKETS—Elevator**

Hendrick Mfg. Co., Carbondale, Pa.

**BUCKETS—Orange Peel**

Hayward Co., 50 Church St., N. Y. C.

**BUCKETS—Single Line**

Milwaukee (Wis.) Electric Crane &amp; Hoist Corp.

**BUCKLES—Bale, Tie**

Joliet (Ill.) Wrought Washer Co.

**BUFFING COMPOSITIONS—Stainless Steel**

McAfee Mfg. Co., The, Detroit, Mich.

**BUFFS**

Divine Brothers Co., Utica, N. Y.

**BUILDINGS—Factory**

Austin Co., The, Cleveland.

Blaw-Knox Co., Pittsburgh.

**BUILDINGS—Steel**

Austin Co., The, Cleveland.

Belmont Iron Works, Phila.

Blaw-Knox Co., Pittsburgh.

McClintic-Marshall Co., Pittsburgh.

**BULLDOZERS**

Beatty Mch. &amp; Mfg. Co., Hammond, Ind.

**BUNDLERS—Strap (Wire)**

Vaughn Mchry. Co., Cuyahoga Falls, O.

**BUNKERS—Coal**

Muskegon (Mich.) Boiler Works

**BURNERS—Oil or Gas**

Anthony Co., The L. I. City, N. Y.

Best, W. N., Corp., 295 5th Ave., N. Y. C.

Economy Furnace Co., Chicopee, Mass.

Freny Engineering Co., Chicago.

Hauck Mfg. Co., 128 Tenth St., Brooklyn, N. Y.

Surface Combustion Co., 2375 Dorr St., Toledo.

**BURRS—Steel**

Master Products Co., The, 6420 Park Ave. S. E., Cleveland.

Wrought Washer Mfg. Co., Milwaukee.

**BUSHINGS—Brass and Bronze**

Buckeye Brass &amp; Mfg. Co., Cleveland.

Bunting Brass &amp; Bronze Co., Toledo.

Erie (Pa.) Bronze Co.

Fredericksen Company, Saginaw, Mich.

Harsch, John, Bronze &amp; Fdry. Co., The, Cleveland, Ohio.

Shenango-Penn Mold Co., Pittsburgh.

**BUSHINGS—Oilless**

Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

**BUSHINGS—Phosphor Bronze**

American Manganese Bronze Co., Phila.

Phosphor Bronze Smelting Co., Phila.

**BY-PRODUCTS COKE & GAS OVENS**

Koppers Construction Co., The, Pittsburgh.

**CABLEWAYS AND TRAMWAYS—See Tramways****CAR SPOTTER (Electric)**

Caldwell, H. W. &amp; Son Co., Chicago, Ill.

**CARBIDE**

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

**CARBURIZING—See Heat Treating****CARS—Dump**

Atlas Car &amp; Mfg. Co., Cleveland

**CARS—Industrial and Mining**

Atlas Car &amp; Mfg. Co., Cleveland.

**CASE HARDDENING—See Heat Treating****CASTERS—Industrial Truck**

Colson Co., The, Elyria, Ohio.

**CASTINGS—Acid or Heat Resisting**

American Manganese Bronze Co., Phila.

American Manganese Steel Co., Chicago Heights, Ill.

Harsch, John, Bronze &amp; Fdry. Co., The, Cleveland, Ohio.

**CEMENT—Leather Belting**

Graton &amp; Knight Co., Worcester, Mass.

**CEMENT—Refractory**

Carborundum Co., The, Perth Amboy, N. J.

Harrison-Walker Refractories Co., Pittsburgh.

Johns-Manville Corp., 292 Madison Ave., New York City.

**CEMENT—Silica and Chrome**

General Refractories Co., Philadelphia, Pa.

Harrison-Walker Refractories Co., Pittsburgh.

**CEMENT ROOFING TILE**

American Cement Tile Mfg. Co., 803 Oliver Bldg., Pittsburgh.

**CENTERING MACHINES**

Whitton, D. E., Mach. Co., New London, Conn.

**CENTERS—Index**

Simmons Mch. Tool Corp., Albany, N. Y.

**CHAINS—Conveyor and Elevator**

Jones &amp; Laughlin Steel Corp., Pittsburgh.

**CASTINGS—Brass, Bronze, Copper or Aluminum**

American Manganese Bronze Co., Phila.

Atlas Brass Fdry. Co., Columbus, Ohio.

Bethlehem (Pa.) Steel Co.

Buffalo (N. Y.) Bronze Die Cast Corp.

Cadman, A. W., Mfg. Co., Pittsburgh.

Erie (Pa.) Bronze Co.

Harsch, John, Bronze &amp; Fdry. Co., The, Cleveland, Ohio.

**CASTINGS—Aluminum**

Harsch, John, Bronze &amp; Fdry. Co., The, Cleveland, Ohio.

**CASTINGS—Die**

Newton Die Casting Corp., New Haven, Conn.

**CASTINGS—Electric Steel**

American Steel Foundries, Chicago.

Calumet Electric Cast Co., Hammond, Ind.

Commercial Steel Casting Co., Marion, O.

Crucible Steel Casting Co., Cleve.

Industrial Steel Casting Co., The, Toledo.

Maynard Elec. Steel Casting Co., Milw.

Smith, Geo. H., Steel Casting Co., Milw.

Treadwell Engineering Co., Easton, Pa.

West Steel Casting Co., The, Cleveland.

**CASTINGS—Gray Iron**

Andes, Inc., Lancaster, Pa.

Bethlehem (Pa.) Steel Co.

Connecticut Fdry. Co., The, Rocky Hill, Conn.

Electric Boat Co., Groton, Conn.

Excelsior Tool &amp; Mch. Co., E. St. Louis, Ill.

Exter, Weiser Co., York, Pa.

Forest City-Walworth Run Fdrles. Co., Cleve.

Hill Clutch Machine &amp; Foundry Co., 6103 Breakwater Ave., N.W., Cleveland, O.

Hyde Park (Pa.) Fdry. &amp; Mach. Co.

Kline Hardware Co., Allentown, Pa.

Moloch Fdry. &amp; Mch. Co., Kaukauna, Wis.

National Fdry. &amp; Fdry. Co., Avonmore, Pa.

Newark (N. J.) Malleable Iron Wks.

North Wales (Pa.) Mach. Co., Inc.

Parkersburg (W. Va.) Rig &amp; Reel Co.

Penn Foundry &amp; Mfg. Co., Box 183, Reading, Pa.

Pole Engng. &amp; Mch. Co., Balto., Md.

Roxburyford (Pa.) Fdry. &amp; Mch. Co., Inc.

Sebastopol Foundry Co., The, Bristol, Conn.

Spencer's, T. S. Sons, Inc., Guilford, Ct.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

Toledo (O.) Mch. &amp; Tool Co.

York (Pa.) Fdry. &amp; Mch. Co.

**CHUCKING MACHINES—Automatic**

Baird, Mch. Co., Bridgeport, Conn.

**CHUCKING MACHINES—Multiple Spindle**

Baird, Mch. Co., Bridgeport, Conn.

National Acme Co., Cleveland.

**CHUCKS—Air Operated**

Logansport (Ind.) Mch. Co.

**CHUCKS—Drill**

Cleveland (O.) Twist Drill Co.

Morse Twist Drill &amp; Mch. Co., New Bedford, Mass.

**CHUCKS—Lathe**

Hoggs &amp; Pettis Mfg. Co., New Haven, Conn.

Union Mfg. Co., New Britain, Conn.

Whitton, D. E., Mch. Co., New London, Conn.

**CIRCLES—Phosphor Bronze**

Phosphor Bronze Smelting Co., Phila.

**CLAMPS—Drop Forged**

Williams, J. H., &amp; Co., Buffalo, N. Y.

**CLEANERS—Metal**

American Chemical Paint Co., Ambler, Pa.

Ford, J. B., Co., Wyandotte, Mich.

Meeker Co., The, Chicago.

Osaki Prod. Inc., 22 Thames St., N. Y. C.

**CLUTCHES—Friction**

Caldwell, W. E., Co., 260 Brandeis Street,

Louisville, Ky.

Johns-Manville Corp., 292 Madison Ave.,

New York City.

Jones, W. A., Fdry. &amp; Mch. Co., 442 W. Roosevelt Road, Chicago.

Twin Disc Clutch Co., Racine, Wis.

**CLUTCHES—Magnetic**

Cutler-Hammer, Inc., Milwaukee.

Dings Magnetic Separator Co., Milwaukee.

Magnetic Mfg. Co., 626 No. 28th St., Milwaukee.

**COAL, ORE AND ASH HANDLING MACHINERY**

Cleveland (O.) Cliffs Iron Co.

Hanna Furnace Corp., The, Detroit, Mich.

Pickands, Mather &amp; Co., Cleveland, Ohio.

Rogers, Brown &amp; Crocker Bros., Inc., 21 E. 40th St., N. Y. C.

**COAL, ORE AND ASH HANDLING MACHINERY**

Cleveland (O.) Cliffs Iron Co.

Hillman Coal &amp; Coke Co., Pittsburgh.

Pickands, Mather &amp; Co., Cleveland.

Rogers, Brown &amp; Crocker Bros., Inc., 21 E. 40th St., N. Y. C.

Walter-Wallingford &amp; Co., Cincinnati, O.

**COAL OVEN MACHINERY**

Alliance (O.) Machine Co.

Atlas Car &amp; Mfg. Co., Cleveland.

Koppers Construction Co., The, Pittsburgh.

**COKE OVENS—By-Products**

Koppers Construction Co., The, Pittsburgh.

**COKE OVENS—Cross Regenerators**

Koppers Construction Co., The, Pittsburgh.

**COKE OVENS—with Recovery of By-Products**

Koppers Construction Co., The, Pittsburgh.

**COLLETS**

**CONTROLLERS—Temperature**

Bristol Co., Waterbury, Ct.  
Wilson-Maeulen Co., Inc., 738 E. 143rd St., N. Y. C.

**CONTROLLERS—Valve, Electrically Operated**

Cutter-Hammer, Inc., Milwaukee.

**CONVEYING AND ELEVATING MACHINERY**

Bartlett, C. O. & Snow Co., Cleveland.  
Industrial Brownhoist Corp., Cleveland.  
Portable Machinery Co., Clifton, N. J.

**CONVEYORS—Portable**

Portable Machinery Co., Clifton, N. J.

**COPING MACHINES**

Cleveland (O.) Punch & Shear Wks. Co.  
Pels, Henry, & Co., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

**CORUNDUM WHEELS—See Grinding Wheels****COTTERS AND KEYS—Spring**

Bindley Mfg. Co., Valley Falls, R. I.  
Hubbard, M. D., Spring Co., Pontiac,  
Mich.  
Smith, F. P., & Co., Sharon Hills, Pa.  
Western Wire Products Co., St. Louis.

**COUNTERBORES**

Cleveland (O.) Twist Drill Co.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Whitman & Barnes, Inc., Detroit, Mich.

**COUNTERS—Production**

Veeder-Root, Inc., Hartford, Ct.

**COUNTERSHAFT—Cone, Variable Speed**

Evans Friction Cone Co., Newton Highlands, Mass.

**COUNTING MACHINES**

Veeder-Root, Inc., Hartford, Ct.

**COUPLINGS—Air Hose**

Cleveland (O.) Pneumatic Tool Co., The.

**COUPLINGS—Flexible**

Boston Gear Works Sales Co., Norfolk Downs, Mass.  
Clark Controller Co., The, Cleveland, O.  
Foot Bros. Gear & Mch. Co., Dept. 33, 111 N. Canal St., Chicago.  
Pooles Engng. & Mch. Co., Balto., Md.

**COUPLINGS—Friction Clutch**

Caldwell, W. E., Co., 260 Brandenburg St., Louisville, Ky.  
Jones, W. A., Fdry. & Mch. Co., 4484 W. Roosevelt Road, Chicago.

**COUPLINGS—Shaft**

Falk Corp., Milwaukee.  
Jones, W. A., Fdry. & Mch. Co., 4434 W. Roosevelt Road, Chicago.  
Tomkins-Johnson Co., Jackson, Mich.

**COUPLINGS—Universal Mill**

Hoagland's, M., Sons Co., Rockaway, N. J.  
CRANES—Crawling Tractor

Browning Crane Co., The, Cleveland.  
Conco Crane & Eng. Wks. Div. of H. D. Conkey & Co., 36 So. Jefferson St., Mendota, Ill.  
Harnischfeger Corp., Milwaukee.  
Orton Crane & Shovel Co., Chicago.

**CRANES—Creepers**

Industrial Brownhoist Corp., Cleveland.  
CRANES—Electric, Industrial Truck Mounted

Baker-Raulang Co., Cleveland, O.  
Crescent Truck Co., Lebanon, Pa.

**CRANES—Electric Traveling**

Alliance (O.) Machine Co.  
American Crane Co., Inc., The, Friendship, N. Y.  
Bedford (Ind.) Foundry & Machine Co.

Bex Crane & Hoist Corp., Phila.  
Browning, Victor R., & Co., Inc., Cleveland, Ohio.

Cleveland Crane & Engng. Co., Wickliffe, O.

Conco Crane & Eng. Wks. Div. of H. D. Conkey & Co., 36 So. Jefferson St., Mendota, Ill.

Euclid (O.) Crane & Hoist Co.  
Harnischfeger Corp., Milwaukee.

Manning, Maxwell & Moore, Inc., 100 E. 42nd St., New York City.  
Maris Brothers, Inc., Phila.

Milwaukee (Wis.) Electric Crane & Hoist Corp.

Morgan Engineering Co., Alliance, O.  
Northern Engineering Wks., 212 Chene St., Detroit.

Payne, N. B., & Co., 25 Church St., N. Y. C.  
Reading (Pa.) Chain & Block Corp.

Robbins & Myers, Inc., Springfield, Ohio.  
Hooper Crane & Hoist Wks., Inc., Reading, Pa.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANES—Gantry**

American Crane Co., Inc., Friendship, N. Y.

Cleveland Crane & Engng. Co., Wick-

Lakeside Bridge & Steel Co., 103 Villard Ave., Milwaukee, Wis.

Manning, Maxwell & Moore, Inc., 100 E. 42nd Street, N. Y. C.

Morgan Engineering Co., Alliance, O.

Northern Engineering Wks., 212 Chene St., Detroit.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANES—Hand Power**

Armington Engineering Co., Euclid, O.

Bedford (Ind.) Foundry & Machine Co.

Box Crane & Hoist Corp., Phila.

Cleveland Crane & Engng. Co., Wick-

liffe, O.

Maris Brothers, Inc., Phila.

Milwaukee (Wis.) Electric Crane & Hoist Corp., Montour Falls, N. Y.

Northern Engineering Wks., 212 Chene St., Detroit.

Reading (Pa.) Chain & Block Corp.

Robbins & Myers, Inc., Springfield, Ohio.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANES—Jib**

Box Crane & Hoist Corp., Phila.

Northern Engineering Wks., 212 Chene St., Detroit.

Reading (Pa.) Chain & Block Corp.

Robbins & Myers, Inc., Springfield, Ohio.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANES—Locomotive**

Browning Crane Co., The, Cleveland.

Harnischfeger Corp., Milwaukee.

Hyman-Michaels Co., Chicago, Ill.

Industrial Brownhoist Corp., Cleveland.

Ohio Locomotive Crane Co., Bucyrus, O.

Orton Crane & Shovel Co., Chicago.

**CRANES—Monorail**

American Monorail Co., The, Cleveland.

Cleveland Electric Tramrail, Wickliffe, O.

Northern Engineering Wks., 212 Chene St., Detroit.

Reading (Pa.) Chain & Block Corp.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANES—Motor Truck**

Browning Crane Co., The, Cleveland.

**CRANES—Portable**

Canton (O.) Fury, & Machine Co.

**CRANES—Portable, Electric**

Automatic Transportation Co., Inc., 101 West 87th St., Chicago, Ill.

**CRANES—Transfer**

Reading (Pa.) Chain & Block Corp.

**CRANES—Wall**

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**CRANK SHAFTS**

Bay City Forge Co., Erie, Pa.

Union Switch & Signal Co., Swedesboro, Pa.

**CRIMPING MACHINES**

Quickwork Co., The (Not Incorporated—

H. Collier Smith, Owner) St. Marys, O.

Steine Tool & Mfg. Co., New Bremen, O.

**CRUCIBLES—Metallurgical**

McCullough-Dalzell Crucible Co., Pgh.

Ross-Tacony Crucible Co., Pala.

**CRUSHERS—Coal**

American Pulverizer Co., St. Louis, Mo.

Bartlett, C. O. & Snow Co., Cleveland.

**CRUSHERS—Steel Turning**

American Crusher & Machinery Corp.

853 B'way, N. Y. C.

American Pulverizer Co., St. Louis, Mo.

**CRUSHERS—Stone**

Morgan Engineering Co., Alliance, O.

Traylor Engng. & Mfg. Co., Allentown, Pa.

**CULVERTS**

Newport (Ky.) Rolling Mill Co.

**CUPOLAS—Foundry**

Northern Engineering Wks., 212 Chene St., Detroit.

**CUTTERS—Milling**

Barker-Collman Co., Rockford, Ill.

Brown & Sharpe Mfg. Co., Provt., R. I.

Cleveland (O.) Twist Drill Co.

Morse Twist Drill & Mch. Co., New Bed-

ford, Mass.

Tonkins-Jackson Co., Jackson, Mich.

Union Twist Drill Co., Athol, Mass.

**CUTTING COMPOUNDS**

Oakite Prod., Inc., 22 Thames St., N. Y. C.

**CUTTING OFF MACHINES—Cold Saw**

Eaton-Lucas Mch. Wks., Philadelphia.

Hurlbut Rogers Mchry. Co., The, Nashua, N. H.

**CUTTING-OFF MACHINES — Pipe or Tubing**

Bardons & Oliver, Cleve.

Bignal & Keeler Mch. Work, Edwards-

Ville, Ill.

Etna Machine Co., The, Toledo, O.

Hurlbut Rogers Mchry. Co., The, Nashua, N. H.

**CUTTING APPARATUS**

—Oxy-Acetylene—See Welding and Cut-

ting Machines and Equipment—Oxy-

Acetylene

**CYLINDERS—Compressed Air, Gas, etc.**

National Tube Co., Pittsburgh.

Smith, A. O., Corp., Milwaukee.

**CYLINDERS—Seamless**

National Tube Co., Pittsburgh.

**DERRICKS**

American-Terry-Derrick Co., South Kear-

ney, N. J.

Hayward Co., The, 50 Church St., N. Y. C.

Lakeside Bridge & Steel Co., 103 Villard

Ave., Milwaukee, Wis.

Malloy Mactory, Corp., Baltimore.

**DIAMOND TOOLS**

Dickinson, Thos. L., 34 Gold St., N. Y. C.

**DIE BLOCKS**

Bethlehem (Pa.) Steel Co.

Heppenstall Co., Pittsburgh.

Wetherell Bros. Co., Cambridge, 30, Mass.

**DIE CUSHIONS—Pneumatic**

Marquette Tool & Mfg. Co., Chicago, Ill.

**DIE SINKING MACHINES—Automatic**

Keller Mechanical Engng. Corp., 78

Washington St., Brooklyn, N. Y.

**DIES—Embossing and Stamping**

Merchant, Gee. F., Co., Chicago.

**DIES—Pipe Threading**

Bignal & Keeler Mch. Wks., Edwards-

Ville, Ill.

Curtis & Curtis Co., Bridgeport, Ct.

Murphy Mch. & Tool Co., 951 Porter

St., Detroit.

**DIES—Screws and Thread Cutting**

Curtis & Curtis Co., Bridgeport, Ct.

Eastern Mach. Screw Corp., New Haven, Ct.

Jones & Lamson Mch. Co., Springfield, Vt.

Murphy Mch. & Tool Co., 951 Porter

St., Detroit.

**DIES—Self-Opening Adjustable**

Consolidated Mch. Tool Corp. of America,

Rochester, N. Y.

Eastern Mach. Screw Corp., New Haven, Ct.

Geometric Tool Co., New Haven, Conn.

Jones & Lamson Mch. Co., Springfield, Vt.

Murphy Mch. & Tool Co., 951 Porter

St., Detroit.

National Acme Co., The, Cleveland.

**DIES—Sheet Metal Working**

Adriance Machine Wks., Inc., 82 Richards

St., Bklyn., N. Y.

Beatty Mch. & Mfg. Co., Hammond, Ind.

Biss, E. W. Co., 53rd St. & 2nd Ave.,

Brooklyn, N. Y.

Budd-Ranney Eng. Co., The Columbus, O.

Ferracane Machine Co., Bridgeton, N. J.

New England Pressed Steel Co., 1 Wash-

ington Ave., Natick, Mass.

Nagara Mch. & Tool Wks., Buffalo, N. Y.

Richardson, L. P., Co., Providence, R. I.

Toledo (O.) Mach. & Tool Co.

Worcester (Mass.) Stamped Metal Co., Zeh & Hahnemann Co., Newark, N. J.

October 2, 1930

**ENGINEERS—Foundry**

Austin Co., The, Cleveland.

**ENGINEERS—Industrial**

Llewelyn, Thomas J., &amp; Co., Pittsburgh.

**ENGINEERS AND CONTRACTORS**

Austin Co., The, Cleveland.

Frey Engineering Co., Chicago.

Kennedy, Julian, Pittsburgh.

Koppers Construction Co., The, Pittsburgh.

Laughlin, Alex., &amp; Co., Pittsburgh.

McKee Arthur G., &amp; Co., Cleveland.

Pennsylvania Engng. Wks., New Castle, Pa.

Stevens, Arthur L., Corp., Chicago.

Swindell-Dressler Corp., Box 1753, Pittsburgh.

**ENGINES—Second Hand**

Archer &amp; Baldwin, Inc., 126 Liberty St., New York City.

**ENGINES—Steam**

Dake Engine Co., Grand Haven, Mich.

**EYELET MACHINES**

Manville, E. J., Mch. Co., Waterbury, Conn.

**EYELETS**

Platt Bros. &amp; Co., The, Waterbury, Conn.

**FACING MACHINES—Structural**

Thomas Spacing Mch. Co., Pittsburgh, Pa.

**FACTORY CONSTRUCTION**

Austin Co., The, Cleveland.

**FANS—Fan Cooling**

Buffalo (N. Y.) Forge Co., 492 B'way.

**FELTS—Wool Mechanical**

Booth Felt Co., Inc., The, 477-478 19th St., Bklyn, N. Y.

Continental Felt Co., 890 B'way, N. Y. C.

Felters Co., The, Boston, Mass.

**FENCES—Woven Wire**

Page Steel &amp; Wire Co., Bridgeport, Conn.

**FENCING—Wire**

Bethlehem (Pa.) Steel Co., Jones &amp; Laughlin Steel Corp., Pittsburgh.

**FERRO ALLOYS—Chromium**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

Lavino, E. J., &amp; Co., Phila.

Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

Samuel, Frank., &amp; Co., Phila.

Vanadium Corp. of America, 120 B'way, New York City.

**FERRO ALLOYS—Manganese**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

Lavino, E. J., &amp; Co., Phila.

Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

Rogers Brown &amp; Crocker Bros., Inc., 21 East 40th St., N. Y. C.

Samuel, Frank., &amp; Co., Phila.

**FERRO ALLOYS—Molybdenum**

Lavino, E. J., &amp; Co., Phila.

**FERRO ALLOYS—Silico Manganese**

Vanadium Corp. of America, 120 B'way, New York City.

**FERRO ALLOYS—Silicon**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

Lavino, E. J., &amp; Co., Phila.

Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

Rogers Brown &amp; Crocker Bros., Inc., 21 East 40th St., N. Y. C.

Samuel, Frank., &amp; Co., Phila.

**FERRO ALLOYS—Vanadium**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

Lavino, E. J., &amp; Co., Phila.

Vanadium Corp. of America, 120 B'way, New York City.

**FERRO ALLOYS—Sphagmiteisen**

Rogers Brown &amp; Crocker Bros., Inc., 21 E. 40th St., N. Y. C.

**FERRO ALLOYS—Titanium**

Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

**FERRO ALLOYS—Tungsten**

Lavino, E. J., &amp; Co., Phila.

Vanadium Corp. of America, 120 B'way, New York City.

**FERRO ALLOYS—Vanadium**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

Lavino, E. J., &amp; Co., Phila.

Vanadium Corp. of America, 120 B'way, New York City.

**FERRO ALLOYS—Zirconium**

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

**FILES AND RASPS**

Atkins, E. C., &amp; Co., Indianapolis, Ind.

Bishton, Henry &amp; Sons, Inc., Philadelphia, Heller Bros. Co., Newark, N. J.

**FILTER CLOTH—Asbestos**

Johns-Manville Corp., 292 Madison Ave., New York City.

**FILTERS—Pressure or Gravity**

Seafle, Wm. B., &amp; Sons Co., Pittsburgh.

**FIRE CLAY**

General Refractories Co., Philadelphia, Pa.

Harrision-Walker Refractories Co., Pittsburgh.

**FITTINGS—Hydraulic**

Watson-Stillman Co., 71 West St., N. Y. C.

**FLANGES—Forged Steel**

Cann &amp; Saul Steel Co., Phila.

Edgewater Steel Co., Pittsburgh.

Taylor Forge &amp; Pipe Wks., Chicago.

**FLANGES—Iron or Steel**

Philadelphia (Pa.) Steel &amp; Iron Co.

**FLEXIBLE SHAFT EQUIPMENT**

Fischer, Chas., Spring Co., 242 Kent Ave., Brooklyn, N. Y.

Keller Mechanical Engng. Corp., 78 Washington St., Brooklyn, N. Y.

**FLOOR ARMORING**

Blaw-Knox Co., Pittsburgh.

Bendix Mfg. Co., Cartondale, Pa.

**FLOOR PLATES—See Plates—Floor or Cellar Door****FLOORING—Crossed Wood**

Jennison-Wright Co., Toledo.

**FLOORING—Monolithic**

Johns-Manville Corp., 292 Madison Ave., New York City.

**FLOORING—Steel**

Blaw-Knox Co., Pittsburgh.

Central Iron &amp; Steel Co., Harrisburg, Pa.

**FLUOROSPAR**

Lavino, E. J., &amp; Co., Phila.

Rogers Brown &amp; Crocker Bros., Inc., 21 E. 40th St., N. Y. C.

**FLUX—Steel**

Denise Corp. of America, Pittsburgh.

**FORGES—Rivet**

Buffalo (N. Y.) Forge Co., 492 B'way.

Champion Blower &amp; Forge Co., Lancaster, Pa.

Hauck Mfg. Co., 128 Tenth St., Bklyn., N. Y.

**FORGING MACHINES**

Amet Machinery Co., Cleveland.

National Machinery Co., Tiffin, Ohio.

**FORGINGS—Alloy Steel**

Bethlehem (Pa.) Steel Co.

Cann &amp; Saul Steel Co., Phila.

Eric (Pa.) Forge Co.

Heppenstall Co., Pittsburgh.

Machinery Forging Co., The, Cleveland, Ohio.

National Forge &amp; Ordnance Co., Irvine, Pa.

**FORGINGS—Brass, Bronze or Copper**

Bossert Corp., The, Utica, N. Y.

**FORGINGS—Coin Pressed**

Rockford (Ill.) Drop Forge Co.

**FORGINGS—Drop, Iron or Steel**

Atlas Drop Forge Co., Lansing, Mich.

Bay City Forge Co., Erie, Pa.

Belden Machine Co., New Haven, Conn.

Bethlehem (Pa.) Steel Co.

Cann &amp; Saul Steel Co., Phila.

Eric (Pa.) Forge Co.

Hoffmann Mfg. Co., Detroit.

Holcroft &amp; Co., Detroit.

Hoisington Mfg. Co., Detroit.

Rockwell, W. S., Co., 50 Church St., N. Y. C.

Surface Combustion Co., 2375 Dorr St., Toledo.

**FORGINGS—Drop, Iron or Steel**

Clapp, E. D., Mfg. Co., The, 86 Division St., Auburn, N. Y.

Cleveland (Ohio) Hardware Co.

General Drop Forge Co., Buffalo, N. Y.

Indianapolis (Ind.) Drop Forging Co.

Keystone Forging Co., Northumberland, Pa.

Kilborn &amp; Bishop Co., The, New Haven, Conn.

Laelde Steel Co., St. Louis, Mo.

Milwaukee (Wis.) Forge &amp; Mfg. Co.

Oliver Iron &amp; Steel Corp., Pittsburgh, Pa.

Paul, W. P., Co., Phila.

Philadelphia (Pa.) Steel &amp; Iron Co.

Rhode Island Tool Co., Providence, R. I.

Rockford (Ill.) Drop Forge Co.

Storms Drop Forging Co., East Springfield, Mass.

Union Switch &amp; Signal Co., Swissvale, Pa.

U. S. Body &amp; Forging Co., Inc., Buffalo, N. Y.

Wilcox, D. M., Mfg. Co., Mechanicsburg, Pa.

Williams, J. H., &amp; Co., Buffalo, N. Y.

**FORGINGS—Hammered**

Eric (Pa.) Forge Co.

Machinery Forging Co., The, Cleveland, Ohio.

**FORGINGS—Hollow**

Eric (Pa.) Forge Co.

National Forge &amp; Ordnance Co., Irvine, Pa.

**FORGINGS—Hydraulic Press, Iron or Steel**

Atlas Drop Forge Co., Lansing, Mich.

Bethlehem (Pa.) Steel Co.

Eric (Pa.) Forge Co.

Pittsburgh (Pa.) Forge &amp; Iron Co.

**FORGINGS—Manganese Steel**

Manganese Steel Forge Co., Phila.

**FORGINGS—Stainless Steel**

Kilborn &amp; Bishop Co., The, New Haven, Conn.

**FORGINGS—Upset**

Bethlehem (Pa.) Steel Co.

Canton (O.) Forge &amp; Axle Co.

Neely Nut &amp; Bolt Co., Pittsburgh.

Rockford (Ill.) Drop Forge Co.

**FORMING AND COILING MACHINES**

Yoder Co., The, Cleveland.

**FOUNDRY EQUIPMENT AND SUPPLIES**

Clifton Mehry, Co., Cincinnati.

National Engineering Company, Chicago.

Northern Engineering Works, 212 Chenoweth St., Detroit.

Sly, W. W., Mfg. Co., Cleveland, Ohio.

**FROGS AND SWITCHES—Railway**

Bethlehem (Pa.) Steel Co.

**FURNACES—Billet or Ingot Heating**

Hagan, Geo. J., Co., Pittsburgh.

Surface Combustion Co., 2375 Dorr St., Toledo.

Swindell-Dressler Corp., Box 1753, Pittsburgh.

**FURNACES—Blast**

Frey Engineering Co., Chicago.

Muskegon (Mich.) Boiler Works.

Pennsylvania Engng. Works, New Castle, Pa.

**FURNACES—Crucible**

Swindell-Dressler Corp., Box 1753, Pittsburgh.

**FURNACES—Electric Steel Melting**

Detroit (Mich.) Electric Furnace Co.

Pittsburgh (Pa.) Electric Furnace Corp.

Swindell-Dressler Corp., Box 1753, Pittsburgh.

**FURNACES—Enameling**

Carborundum Co., The, Perth Amboy, N. J.

**FURNACES—Forging**

Best, W. N., Corp., 295 5th Ave., N. Y. C.

Holcroft &amp; Co., Detroit.

Rockwell, W. S., Co., 50 Church St., N. Y. C.

Surface Combustion Co., 2375 Dorr St., Toledo.

**FURNACES—Heat Treating, Automatic**

Best Duty Electric Co., Milwaukee.

Holcroft &amp; Co., Detroit.

Rockwell, W. S., Co., 50 Church St., N. Y. C.

Surface Combustion Co., 2375 Dorr St., Toledo.

**FURNACES—Heat Treating, Cyanide or Lead**

American Electric Furnace Co., Boston.

Amer. Gas Furnace Co., Elizabeth, N. J.

Hevi Duty Electric Co., Milwaukee.

Hyro Mfg. Co., 205 Varick St., N. Y. C.

Rockwell, W. S., Co., 50 Church St., N. Y. C.

Surface Combustion Co., 2375 Dorr St., Toledo.

**FURNACES—Heat Treating, Oil or Gas**

Amer. Gas Furnace Co., The, 477-478 19th St., Bklyn., N. Y.

Continental Felt Co., 890 B'way, N. Y. C.

Felters Co., The, Boston, Mass.

**GATES—Blast**

Rockwell, W. S., Co., 50 Church St., N. Y. C.

**GATES**

**GEARS—Enclosed Herringbone Transmission**  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.

**GEARS—Heat Treated**  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.

**GEARS—Herringbone**  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Earle Gear & Machine Co., Phila.  
Falk Corp., Milwaukee.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Philadelphia (Pa.) Gear Works

**GEARS—Machine Cut**  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.

**GEARS—Machine Molded**  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.  
**GEARS—Non-Metallic**  
Akron (O.) Gear & Engng. Co.  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Grant Gear Works, Boston.  
Horsburgh & Scott Co., Cleve.  
Philadelphia (Pa.) Gear Works

**GEARS—Rawhide**  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Ferguson Gear Co., Gastonia, N. C.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.

**GEARS—Speed Reducing**  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Cleveland (O.) Worm & Gear Co.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Hindley Gear Co., Phila.  
Horsburgh & Scott Co., Cleve.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.  
Philadelphia (Pa.) Gear Works

**GEARS—Spiral**  
Ferguson Gear Co., Gastonia, N. C.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
**GEARS—Spur**  
Boston Gear Works Sales Co., Norfolk  
Downs, Mass.  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Earle Gear & Mch. Co., Phila.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Grant Gear Works, Boston.  
Hartford (Pa.) Special Mchry. Co.  
Horsburgh & Scott Co., Cleve.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.  
Philadelphia (Pa.) Gear Works

**GEARS—Worm, Speed Reducers**  
Caldwell, H. W. & Son Co., Chicago, Ill.  
Cleveland (O.) Worm & Gear Co.  
De Laval Steam Turbine Co., Trenton, N. J.  
Foote Bros. Gear & Mch. Co., Dept. 33,  
111 N. Canal St., Chicago.  
Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.  
Philadelphia (Pa.) Gear Works.

**GENERATORS—Acetylene**  
Air Reducing Sales Co., 60 East 42nd  
St., N. Y. C.  
**GENERATORS—Electric**  
Lincoln Electric Co., Cleveland.  
**GENERATORS—Electric, Second Hand**  
Belyea Co., Inc., 147 W. 18th St., N.  
Y. C.  
Motor Repair & Mfg. Co., Cleveland, O.  
Zelzicker in St. Louis, Mo.

**GENERATORS—Electroplating**  
Meeker Co., The, Chicago.  
**GLUE HEATERS**  
Dart, E. M. Mfg. Co., Prov., R. I.  
**GOVERNORS—Air Compressor**  
Westinghouse Traction Brake Co., Wil-  
merding, Pa.

**GRATING—Flooring, Sidewalk, Etc.**  
Blaw-Knox Co., Pittsburgh.  
Hendrick Mfg. Co., Carbondale, Pa.

**GRATING—Steel**  
Blaw-Knox Co., Pittsburgh.

**GRINDING AND POLISHING MA-  
CHINES**

Black & Decker Mfg. Co., The, Towson,  
Md.  
Bridgeport (Ct.) Safety Emery Wheel  
Co., Inc.  
Calder, Geo. H., Lancaster, Pa.  
Cincinnati Electrical Tool Co., Cincinnati,  
Ohio.  
Excelsior Tool & Mch. Co., East St.  
Louis, Ill.  
Norton Co., Worcester, Mass.  
Safety Grinding Wheel & Mch. Co., The,  
Springfield, O.  
Springfield Mfg. Co., Bridgeport, Ct.  
Sterling Grinding Wheel Co., Tiffin, Ohio.

**GRINDING MACHINES—Cam**

Landis Tool Co., Waynesboro, Pa.

**GRINDING MACHINES—Cutter and  
Reamer**

Landis Tool Co., Waynesboro, Pa.  
Thompson Grinder Co., Springfield, O.

**GRINDING MACHINES—Cylindrical**

Brown & Sharpe Mfg. Co., Prov., R. I.

Landis Tool Co., Waynesboro, Pa.

Norton Co., Worcester, Mass.

**GRINDING MACHINES—Die**

Bignal & Keefer Mch. Wks., Edwards  
ville, Ill.

**GRINDING MACHINES—Disc**

Gardner Mach. Co., Beloit, Wis.

Production Mch. Co., Greenfield, Mass.

**GRINDING MACHINES—Drill**

Sellers, William, & Co., Inc., Phila.

**GRINDING MACHINES—Flexible Shaft**

Keller Mechanical Engng. Corp., 78  
Washington St., Brooklyn, N. Y.

**GRINDING MACHINES—Internal**

Landis Tool Co., Waynesboro, Pa.

**GRINDING MACHINES—Machine  
Knives**

Atkins, E. C., & Co., Indianapolis, Ind.

Bridgeport (Ct.) Safety Emery Wheel Co.,  
Inc.

**GRINDING MACHINES—Portable Elec-  
tric**

Standard Electrical Tool Co., The, Cincl.

**GRINDING MACHINES—Portable Pneu-  
matic**

Cleveland (O.) Pneumatic Tool Co., The.

Warner & Swasey Co., The, Cleveland.

**GRINDING MACHINES—Roll**

Landis Tool Co., Waynesboro, Pa.

**GRINDING MACHINES—Second Hand**

Morey & Co., Inc., 410 Broome St.  
N. Y. C.

**GRINDING MACHINES—Snagging**

Warner & Swasey Co., The, Cleveland.

**GRINDING MACHINES—Spring**

Sleeper & Hartley, Inc., Worcester, Mass.

**GRINDING MACHINES—Surface**

Abrasive Machine Tool Co., F. Prov., R. L.

Blanchard Mach. Co., Cambridge, Mass.

Bridgeport (Ct.) Safety Emery Wheel Co.,  
Inc.

Norton Co., Worcester, Mass.

**GRINDING MACHINES—Swing Frame**

Black & Decker Mfg. Co., The, Towson,  
Md.

Safety Grinding Wheel & Mch. Co., The,

Springfield, O.

**GRINDING MACHINES—Tool**

Landis Tool Co., Waynesboro, Pa.

LeBlond, R. K., Mch. Tool Co., Cinn.

Norton Co., Worcester, Mass.

Sellers, William, & Co., Inc., Phila.

Taylor & Fenn Co., Hartford, Ct.

**GRINDING MACHINES—Universal**

Landis Tool Co., Waynesboro, Pa.

Norton Co., Worcester, Mass.

Simmons Mach. Tool Corp., Albany, N. Y.

Thompson Grinder Co., Springfield, O.

**GRINDING MACHINES—Vertical Sur-  
face**

Blanchard Mach. Co., Cambridge, Mass.

**GRINDING WHEEL DRESSERS AND  
CUTTERS**

Atkins, E. C., & Co., Indianapolis, Ind.

Calder, Geo. H., Lancaster, Pa.

Dickinson, Thos. L., 34 Gold St., N. Y. C.

**GRINDING WHEELS**

Atkins, E. C., & Co., Indianapolis, Ind.

Carborundum Co., The, Niagara Falls,  
N. Y.

New York Belting & Packing Co., 91-93

Chambers St., N. Y. C.

Norton Co., Worcester, Mass.

Safety Grinding Wheel & Mch. Co., The,

Springfield, O.

Simonds Saw & Steel Co., Fitchburg,  
Mass.

Sterling Grinding Wheel Co., Tiffin, Ohio.

**GUTTERS**  
Newport (Ky.) Rolling Mill Co.

**HACK SAW BLADES—See Saws—Hack  
Saw Blades**

**HACK SAW MACHINES**

Armstrong-Blum Mfg. Co., Chicago.

Atkins, E. C., & Co., Indianapolis, Ind.

Pearless Machine Co., Racine, Wis.

Racine Tool & Mch. Co., 1755 State St.

Racine, Wis.

**HAMMER RAMS**

Heppenstall Co., Pittsburgh.

**HAMMERS—Air**

Nazal Engng. & Mch. Wks., Phila.

**HAMMERS—Belt or Motor Driven (Forg-  
ing)**

Barbour-Stockwell Co., Cambridge, Mass.

Chamberlain (Pa.) Engng. Co.

Moloch Fdry. & Mch. Co., Kaukauna, Wis.

Nazal Engng. & Mch. Wks., Phila.

**HAMMERS—Belt or Motor Driven (Sheet  
Metal)**

Quickwerk Co., The (Not Incorporated—

H. Collier Smith, Owner), St. Mary's

Ohio.

Toder Co., The, Cleveland.

**HAMMERS—Drop**

Chambersburg (Pa.) Engng. Co.

Industrial Brownhoist Corp., Cleveland.

Morgan Engng. Co., Alliance, O.

Standard Machinery Co., Auburn, R. I.

**HAMMERS—Pneumatic**

Cleveland (O.) Pneumatic Tool Co., The.

**HAMMERS—Pneumatic Forging**

Sullivan Machinery Co., Chicago.

**HAMMERS—Rawhide**

Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.

**HAMMERS—Steam**

Industrial Brownhoist Corp., Cleveland.

Morgan Engng. Co., Alliance, O.

**HANGERS—Factory Door**

Myers, F. E. & Bro. Co., Ashland, O.

**HANGERS—Shaft**

American Pulley Co., Philadelphia.

Hyman, Joseph, & Sons, Phila.

Jones, W. A., Fdry. & Mch. Co., 4434  
W. Roosevelt Road, Chicago.

**HARDNESS TESTING MACHINES**

Shore Instrument & Mfg. Co., Inc., Ja-  
maica, L. I., N. Y.

Wilson-Macneil Co., Inc., 738 E. 143d  
St., N. Y. C.

**HARDWARE—Carriage and Wagon**

Clapp, E. D., Mfg. Co., The, 86 S. Di-  
vision St., Auburn, N. Y.

**HEADING MACHINES**

National Mchry. Co., Tiffin, Ohio.

**HEAT TREATING**

General Machine Wks., York, Pa.

Parish Pressed Steel Co., Reading, Pa.

**HEATERS—Unit**

Buffalo (N. Y.) Forge Co., 492 B'way.

**HEATING AND VENTILATING APPA-  
RATUS**

Buffalo (N. Y.) Forge Co., 492 B'way.

**HINGES—Wrought Brass Butt**

Veeder-Rust, Inc., Hartford, Ct.

**HINGES—Wrought Steel & Brass**

Eager, C. & Sons Hinge Mfg. Co., St.  
Louis, Mo.

**HOBBS**

Barber-Colman Co., Rockford, Ill.

**HOISTING MACHINES**

Shepard Niles Crane & Hoist Corp.,  
Montour Falls, N. Y.

**HOISTS—Air**

Dake Engine Co., Grand Haven, Mich.

Detroit (Mich.) Hoist & Mach. Co.

Hanau Eng. Works, Chicago.

Independent Pneumatic Tool Co., Chicago.

North Engineering Wks., 212 Chene

St., Detroit.

Ridgway, Craig & Son Co., Coatesville,  
Pa.

**HOISTS—Chain**

American MonoBall Co., The, Cleveland.

Barrington Co., The, Pitts.

Reading (Pa.) Chain & Block Corp.

Robbins & Myers, Inc., Springfield, Ohio.

Union Mfg. Co., New Britain, Conn.

**HOISTS—Electric**

American Crane Co., Inc., The, Friend-

ship, N. Y.

American Engineering Co., Aramingo and

Cumberland Sts., Philadelphia.

American MonoBall Co., The, Cleveland.

Box Crane & Hoist Corp., Phila.

Milwaukee (Wis.) Electric Crane & Hoist

Corp., Northern Engineering Wks., 212 Chene

St., Detroit.

Payne, N. B., & Co., 25 Church St., N. Y. C.

Reading (Pa.) Chain & Block Corp.

Robbins & Myers, Inc., Springfield, Ohio.

Roepke Crane & Hoist Works, Inc., Read-

ing, Pa.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

October 2, 1930

**IRON**—Staybolt  
Bethlehem (Pa.) Steel Co.  
Byers, Jas. T., & Son, Inc., Chicago,  
**IRON BARS**  
Pittsburgh (Pa.) Forge & Iron Co.  
**JACKS**—Hydraulic  
Dudicom, Richard, Inc., 24-26 Columbia  
St., New York City.  
**KEYS**—Riveted  
Western Wire Products Co., St. Louis.  
**KEYSEATING MACHINES**  
Baker Bros., Inc., Toledo, O.  
**LACING**—Belt, Rawhide or Leather  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Graton & Knight Co., Worcester, Mass.  
**LAMPS**—Mercury Vapor  
General Electric Vapor Lamp Co., Hoboken, N. J.  
**LATCH DOGS**  
West Steel Casting Co., The, Cleveland.  
Williamson, J. H., & Co., Buffalo, N. Y.  
**LATHES**—Automatic  
Bullard Co., The, Bridgeport, Ct.  
Jones & Lamson Mfg. Co., Springfield, Vt.  
LeBlond, R. K., Mch. Tool Co., Cinc.  
Monarch Mch. Tool Co., The, Sidney, O.  
**LATHES**—Bench  
Ritter Lath & Grinder Corp., Boston  
**LATHES**—Brass  
Warren & Swasey Co., The, Cleveland.  
**LATHES**—Chuckings  
Jones & Lamson Mfg. Co., Springfield, Vt.  
Warren & Swasey Co., The, Cleveland.  
**LATHES**—Crankshaft  
LeBlond, R. K., Mch. Tool Co., Cinc.  
**LATHES**—Engine  
American Tool Works Co., Cinnet.  
Cincinnati (O.) Lathe & Tool Co.  
Consolidated Mch. Tool Corp. of America,  
Rochester, N. Y.  
Hollis, Clarke & Co., Chicago, 647 W.  
Washington Blvd., Chicago, Ill.  
LeBlond, R. K., Mch. Tool Co., Cinc.  
Lodge & Shipley Mch. Tool Co., Cincl.  
Monarch Mch. Tool Co., The, Sidney, O.  
Monarch Mch. Co., Philadelphia, Pa.  
Ottoline & Sexton Mch. Co., Columbus, O.  
Reed-Prentiss Corp., Worcester, Mass.  
Hoover, Jas. T., & Son, Inc., Chicago.  
**LATHES**—Roll  
Lewis Foundry & Mch. Co., Ptgk.  
United Eng'g & Fds. Co., Ptgk.  
**LATHES**—Second-Hand  
Brotnell Mchry. Co., Provt., R. I.  
Eastern Mchry. Co., Cincinnati.  
Miles Mchry. Co., Saginaw, W. S., Mich.  
Morse & Dyer, 140 Broome St., N. Y. C.  
Russell Mch. Co., Ptgk.  
Selfred-Elastid Mchry. Co., Dayton, O.  
Simmons Mch. Tool Corp., Albany, N. Y.  
**LATHES**—Spinning  
Adriance Mach. Works, Inc., 82 Richard  
St., Brooklyn, N. Y.  
**LATHES**—Turret  
Barber & Oliver, Cleve.  
Bullar Co., The, Bridgeport, Ct.  
Cincinnati (O.) Lathe & Tool Co.  
Jones & Lamson Mfg. Co., Springfield, Vt.  
Warren & Swasey Co., The, Cleveland.  
**LEAD BURNING**  
Gross Lead Burning & Coating Corp.,  
Cleveland.  
**LEAD-LINED APPARATUS**  
Gross Lead Burning & Coating Corp.,  
Cleveland.  
**LEATHER**—Cup  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Graton & Knight Co., Worcester, Mass.  
**LEATHER**—Hydraulic  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Graton & Knight Co., Worcester, Mass.  
**LEVELING MACHINES**  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
**LEVELS**—Precision Machine Aligning  
Universal Boring Mch. Co., Hudson, Mass.  
**LIMESTONE**—Low Silica  
Baker, J. E., Co., York, Pa.  
**LINING**—Converter  
Edge Hill Silica Rock Co., New Brun-  
wick, N. J.  
Harrison-Walker Refractories Co., Ptgk.  
**LINING**—Cupola  
Edge Hill Silica Rock Co., New Brun-  
swick, N. J.  
Harrison-Walker Refractories Co., Ptgk.  
**LIQUIDATORS**  
Llewelyn, Thomas J., & Co., Ptgk.  
**LOCK WASHER MACHINERY**  
Sleeper & Hartley, Inc., Worcester, Mass.

**LOCOMOTIVES**—Electric  
Atlas Car & Mfg. Co., Cleve.  
**LOCOMOTIVES**—Gasoline  
Plymouth (O.) Locomotive Wks.  
**LOCOMOTIVES**—Industrial  
Plymouth (O.) Locomotive Wks.  
**LOCOMOTIVES**—Storage Battery  
Atlas Car & Mfg. Co., Cleve.  
**LUGS**—Terminal  
Wolverine Tube Co., Detroit.  
**LUMBER**—Creoseted or Zinc Treated  
Century Wood Preserving Co., Ptgk.  
**MACHINE WORK**  
Ams. Max. Mach. Co., The, Bridgeport,  
Conn.  
Cavagnaro, John J., Harrison, N. J.  
Cowdrey, C. H., Machine Co., 30 Summer  
St., Fitchburg, Mass.  
Fabricated Steel Products Co., Wheeling,  
W. Va.  
General Mach. Works, York, Pa.  
Mohr Fdry. & Mch. Co., Kaukauna, Wis.  
Royerford (Pa.) Fdry. & Mch. Co., Inc.  
**MACHINERY DEALERS**  
Brownell Mchry. Co., Provt., R. I.  
Delta Equipment Co., Philadelphia.  
Dunahue Steel Products Co., 1600 West  
7th St., Chicago.  
Dony, D. E., Rochester, N. Y.  
Eastern Mchry. Co., Cincinnati.  
Edley, E. L., Mchry. Co., Cleve.  
Fremont & Co., 150 Bank St., N. Y. C.  
General Mchry. Co., Boston, Mass.  
Hill, Clarke & Co., Chicago, 647 W.  
Washington Blvd., Chicago, Ill.  
Hymen-Michigan Co., Chicago, Ill.  
Johnson, Wm. C., & sons Mchry. Co.,  
St. Louis, Mo.  
MacCabe, T. B., Philadelphia, Pa.  
Marshall-Guthrie Mchry. Co., Ptgk.  
Miles Mchry. Co., Saginaw, W. S., Mich.  
Monarch Mchry. Co., Philadelphia.  
Morey & Co., Inc., 410 Broome St., N. Y. C.  
Noble Mchry. Co., Inc., 297 Centre St.,  
N. Y. C.  
O'Brien Mchry. Co., Phila.  
Ranville Mchry. Co., 1772 Powers St.,  
Cincinnati, Ohio.  
Reliance Mchry. Sales Co., Ptgk.  
Kryson, Jas. T., & Son, Inc., Chicago.  
Schouemaker, A. G., & Sons, Inc., 30  
Church St., New York City.  
Seifert-Elastid Mchry. Co., Dayton, O.  
Simmons Mch. Tool Corp., Albany, N. Y.  
Smith, H. A., Mchry. Co., Syracuse, N. Y.  
Wach-Gregg & Co., Chicago.  
West Penn Mchry. Co., Pittsburgh.  
White, A. D., Mchry. Co., Cleve.  
Zehnicker in St. Louis, Mo.  
**MACHINISTS**—Contracting  
Kongslig, Otto, Mfg. Co., Cleve.  
**MAGNESITE**—Brick or Dead Burnt  
Carborundum Co., The, Niagara Falls,  
N. Y.  
Harrison-Walker Refractories Co., Ptgk.  
Lavine, E. J., & Co., Phila.  
**MAGNETIC EQUIPMENT**  
Magnetic Mch. Co., 926 So. 28th St.,  
Milwaukee, Wis.  
**MAGNETS**—Electro Industrial  
Dings Magnetic Separator Co., Milwaukee.  
**MAGNETS**—Lifting  
Cutler-Hammer, Inc., Milwaukee.  
Electric Controller & Mfg. Co., Cleve.  
Ohio Electric Mfg. Co., Cleve.  
**MALLETS**—Rawhide  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
**MANGANESE METAL**  
Electro Metallurgical Sales Corp., 30 E.  
42nd St., New York City.  
**MAGNETS**—Electro Industrial  
Dings Magnetic Separator Co., Milwaukee.  
**MANHOLE STEPS**  
Nicetown Plate Washer Co., Inc., Phila.  
**MARKING MACHINES**  
Noble & Westbrook Mfg. Co., Hartford, Ct.  
**METAL SPECIALTIES**  
American Pulley Co., Philadelphia.  
Amer. Spring & Mfg. Corp., Helleys, Mich.  
Beardsley & Walcott Mfg. Co., Water-  
bury, Conn.  
Bossert Corp., The Utica, N. Y.  
Cuyahoga Co., Cleve.  
Detroit (Mich.) Metal Specialty Corp.  
Gender, Paeschke & Frey Co. (Contract  
Mfg. Div.), Milwaukee.  
Globe Mach. & Stng. Co., Cleve.  
Haasall, John, Inc., Clay & Oakland Sts.,  
Brooklyn, N. Y.  
Torrington (Ct.) Co.  
Worcester (Mass.) Pressed Steel Co.  
Worcester (Mass.) Stamped Metal Co.  
York (Pa.) Corrugating Company.  
**METALINE**  
Rhoades, R. W., Metaline Co., Inc.,  
Long Island City, N. Y.  
**MICA SCHIST**  
Edge Hill Silica Rock Co., New Brun-  
swick, N. J.  
**NUTS**—Acorn  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Western Screw Products Co., St. Louis.  
**NUTS**—Castellated  
National Arms Co., The, Cleveland.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Western Screw Products Co., St. Louis.  
**NUTS**—Cold Punched  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
**NUTS**—Hot Pressed  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
**NUTS**—Milled  
National Arms Co., The, Cleveland.  
Westfield (Mass.) Nut Co.  
**NUTS**—Semi-Finished  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Westfield (Mass.) Nut Co.

**MILLING MACHINES**—Horizontal  
Consolidated Mch. Tool Corp. of America,  
Rochester, N. Y.  
Delaney (O.) Mch. Wks.  
Kearney & Trecker Corp., Milwaukee.  
**MILLING MACHINES**—Plain  
Kearney & Trecker Corp., Milwaukee.  
Kyson, Jas. T., & Son, Inc., Chicago.  
**MILLING MACHINES**—Planer Type  
Sellers, William, & Co., Phila.  
**MILLING MACHINES**—Second-Hand  
Eastern Mchry. Co., Cincinnati.  
Simmons Mch. Tool Corp., Albany, N. Y.  
**MILLING MACHINES**—Universal  
Brown & Sharpe Mch. Co., Prov., R. I.  
Kyson, Jas. T., & Son, Inc., Chicago.  
**MILLING MACHINES**—Vertical  
Reed-Prentiss Corp., Worcester, Mass.  
**MIXING MACHINES**—Sand  
Bartlett, C. O. & Snow Co., Cleveland.  
National Engineering Co., Chicago.  
**MOLDING MACHINES**—Jarring (Air)  
Arcade Mch. Co., Freeport, Ill.  
Herman Pneumatic Mch. Co., Pittsburgh.  
Nichols, Wm. H., Co., Inc., 91st Ave.  
& 126th St., Richmond Hill, N. Y.  
**MOLDING MACHINES**—Releover (Hand  
and Power Operated)  
Arcade Mch. Co., Freeport, Ill.  
Herman Pneumatic Mch. Co., Pittsburgh.  
**MOLDING MACHINES**—Sand Throwing  
Bardsley & Piper Co., Chicago, Ill.  
**MOLDING MACHINES**—Stripping Plate  
Nichols, Wm. H., Co., Inc., 91st Ave.  
& 126th St., Richmond Hill, N. Y.  
**MONORAIL SWITCHES AND TURN-  
TABLES**  
Reading (Pa.) Chain & Block Corp.  
**MONORAIL**—Overhead  
American Monorail Co., The, Cleveland.  
Reading (Pa.) Chain & Block Corp.  
**MOTORS**—Electric  
Allis-Chalmers Mch. Co., Milwaukee.  
Century Electric Co., St. Louis, Mo.  
Leland Electric Co., The, Dayton, Ohio.  
Lincoln Electric Co., Cleveland.  
Ohio Electric Mfg. Co., Cleve.  
Robbins & Myers, Inc., Springfield, Ohio.  
**MOTORS**—Electric—Fractional H.P.  
Ohio Electric Mch. Co., Cleveland.  
**MOTORS**—Electric, Second-Hand  
Belva Co., Inc., 137 W. 18th St., N. Y.  
Delta Equipment Co., Philadelphia.  
Motor Repair & Mch. Co., Cleveland, O.  
O'Brien Mchry. Co., Phila.  
**NAILS**—Wire  
Bethlehem (Pa.) Steel Co.,  
Wheeling (W. Va.) Steel Corp.  
**NICKEL**  
International Nickel Co., Inc., 67 Wall  
St., New York City.  
**NICKEL ANODES**—Rolled or Cast  
Seymour (Ct.) Mch. Co.  
**NITROGEN**  
Air Reduction Sales Co., 60 East 42nd  
St., N. Y. C.  
**NUMBERING MACHINES**—For Metal  
Noble & Westbrook Mfg. Co., Hartford,  
Ct.  
**NUT MAKING MACHINERY**  
Budd-Ranney Eng. Co., The, Columbus, O.  
National Mchry. Co., Tiffin, Ohio.  
**NUTS**—Acorn  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Western Screw Products Co., St. Louis.  
**NUTS**—Castellated  
National Arms Co., The, Cleveland.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Western Screw Products Co., St. Louis.  
**NUTS**—Hot Pressed  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
**NUTS**—Milled  
National Arms Co., The, Cleveland.  
Westfield (Mass.) Nut Co.  
**NUTS**—Semi-Finished  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
Westfield (Mass.) Nut Co.

**NUTS**—Thumb Malleable  
Philadelphia (Pa.) Hardware & Malleable  
Iron Wks., Inc.  
Russell, Burdall & Ward Bolt & Nut  
Co., Port Chester, N. Y.  
**OIL STONES**  
Carborundum Co., The, Niagara Falls,  
N. Y.  
**ORES**—Chamo, Lump and Ground  
Harrison-Walker Refractories Co., Ptgk.  
Lavine, E. J., & Co., Phila.  
**ORES**—Iron  
Cleveland (O.) Cliffs Iron Co.  
Hanna Furnace Corp., The, Detroit, Mich.  
Pickands, Mather & Co., Cleveland.  
Pilling & Co., Inc., Phila.  
Rogers Brown & Crocker Bros., Inc., 31  
East 40th St., N. Y. C.  
**ORES**—Manganese  
Lavine, E. J., & Co., Phila.  
**OVENS**—Baking  
Drying Systems, Inc., Chicago, Ill.  
Gehrich Oven Co., Inc., Long Island  
City, N. Y.  
Surface Combustion Co., 2375 Duff St.,  
Toledo.  
Young Bros. Co., Detroit.  
**OVENS**—Coke & By-Product Recovery  
Koppers Construction Co., The, Ptgk.  
**OVENS**—Core and Mold  
Drying Systems, Inc., Chicago, Ill.  
Gehrich Oven Co., Inc., Long Island  
City, N. Y.  
Holdcroft & Co., Detroit.  
Young Bros. Co., Detroit.  
**OVENS**—Cross Regenerative  
Koppers Construction Co., The, Ptgk.  
**OVENS**—Drying  
Detroit (Mich.) Sheet Metal Wks.  
Drying Systems, Inc., Chicago, Ill.  
Young Bros. Co., Detroit.  
**OVENS**—Enameling and Japping  
Carborundum Co., The, Perth Amboy, N.J.  
Drying Systems, Inc., Chicago, Ill.  
Gehrich Oven Co., Inc., Long Island  
City, N. Y.  
Surface Combustion Co., 2375 Duff St.,  
Toledo.  
Young Bros. Co., Detroit.  
**OVERHEAD CARRYING EQUIPMENT**  
—See Monorail—Overhead  
**OXYGEN**  
Air Reduction Sales Co., 60 East 42nd  
St., N. Y. C.  
**PACKING**—Leather  
Chicago (Ill.) Rawhide Mfg. Co., 1313  
Elston Ave.  
Graton & Knight Co., Worcester, Mass.  
Watson-Stillman Co., 71 West St., N. Y.  
**PACKING**—Sheet, Asbestos or Rubber  
John Manville Corp., 292 Madison Ave.,  
New York City.  
**PAINTS**—Metal Protective  
Semet-Solvay Co., 61 B'way., N. Y. C.  
**PANS**—Grinding  
National Engineering Co., Chicago.  
**PATENT ATTORNEYS**  
Boyle, John, Jr., Washington, D. C.  
**PATENTING EQUIPMENT**—Wire  
Vaughn Mchry. Co., Cuyahoga Falls, O.  
**PATTERNS**—Wood and Metal  
Bascom & Co., Troy, N. Y.  
**PERFORATED METAL**  
Chicago Perforating Co., Chicago, Ill.  
Erie Perforating Co., Rochester, N. Y.  
Harrington & King Perforating Co., Chi.  
Hendrick Mfg. Co., Carlisle, Pa.  
Mundt, Chas., & Sons, Jersey City, N. J.  
Wickwire Spencer Steel Co., 41 E. 42nd,  
N. Y. C.  
**PHOSPHOR**—Copper  
Phosphor Bronze Smelting Co., Phila.  
**PHOSPHORIZERS**  
McCullough-Dalzell Crucible Co., Ptgk.  
**PICKLING COMPOUNDS**  
American Chemical Paint Co., Ambler, Pa.  
**PICKLING MACHINES**  
Acterna-Standard Eng. Co., Youngstown, O.  
Meeker Co., The, Chicago.  
Ransohoff, N. Inc., Cincinnati, O.  
**PIG IRON**  
Alan Wood Steel Co., Conshohocken, Pa.  
Bethlehem (Pa.) Steel Company,  
Chateaugay Ore & Iron Co., 26 Liberty  
St., N. Y. C.  
Cleveland (O.) Cliffs Iron Co.  
Hanna Furnace Corp., The, Detroit, Mich.  
Lavine, E. J., & Co., Phila.  
Pickands, Mather & Co., Cleve.  
Pilling & Co., Inc., Phila.  
Republic Steel Corp., Youngstown, Ohio.  
Rogers Brown & Crocker Bros., Inc., 31  
East 40th St., N. Y. C.

ALL THESE COMPANIES CARRY AN AD IN THIS ISSUE  
ALPHABETICAL INDEX . . . . . PAGES 214-216

**Shenango-Penn Mold Co.**, Pittsburgh.  
Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.  
**Walter-Wallingford & Co.**, Cincinnati.  
**Wickwire Spencer Steel Co.**, 41 E. 42nd, N. Y. C.

**PIG IRON—Low Phosphorus**  
Chateaugay Ore & Iron Co., 26 Liberty St., N. Y. C.

**PILING—Steel Sheet**  
Bethlehem (Pa.) Steel Company.

**PINIONS—Wire and Rod**  
Rathbone, A. B., & J. Palmer, Mass.

**PINS—Airbrake**  
Champion Rivet Co., Cleveland, Ohio.

**PINS—Chain**  
Champion Rivet Co., Cleveland, Ohio.

**PINS—Coupler**  
Champion Rivet Co., Cleveland, Ohio.

**PIPE—Cast Iron, B. & S. and Flanged**  
Wood, R. D., & Co., Philadelphia.

**PIPE—Chrome Alloy**  
Babcock & Wilcox Tube Co., 85 Liberty St., N. Y. C.

**PIPE—Forged Steel**  
Kellogg, M. W., Co., The, 225 Bdway., N. Y. C.

**PIPE—Genuine Wrought Iron**  
Keating, E. F., Co., 452 Water St., N. Y. C.

**PIPE—Hammer Welded**  
National Tube Co., Pittsburgh.

**PIPE—New and Second-Hand**

Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.  
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.  
Greenpoint Iron & Pipe Co., Inc., 187-197 Maspeth Ave., Bklyn., N. Y.  
Hudson Pipe & Supply Co., Bayonne, N. J.  
L. & D. Pipe Supply Co., Inc., 1100 Flushing Ave., Bklyn., N. Y.

**PIPE—Riveted Steel**  
Abendroth & Root Mfg. Co., Newburgh, N. Y.

**PIPE—Seamless Steel**  
Babcock & Wilcox Tube Co., 85 Liberty St., N. Y. C.  
Spang, Chalfant & Co., Inc., Pittsburgh, Pa.

**PIPE—Spiral Riveted**  
Abendroth & Root Mfg. Co., Newburgh, N. Y.  
Taylor Forge and Pipe Works, Chicago.

**PIPE—Standard, Black and Galvanized**

Bethlehem (Pa.) Steel Co.  
Jones & Laughlin Steel Corp., Pgh.  
Keating, E. F., Co., 452 Water St., N. Y.  
National Tube Co., Pittsburgh.  
Republic Steel Corp., Youngstown, Ohio.  
Smith, A. O., Corp., Milwaukee.  
Spang, Chalfant & Co., Inc., Pittsburgh, Pa.  
Wheeling (W. Va.) Steel Corp.

**PIPE—Welded, Electric**  
Smith, A. O., Corp., Milwaukee.  
Republic Steel Corp., Youngstown, Ohio.

**PIPE—Wrought Iron**  
Keating, E. F., Co., 452 Water St., N. Y. C.

**PIPE BENDING MACHINES**  
Newbold, R. S., & Son Co., Norristown, Pa.

**PIPE COVERING—Asbestos**  
Johns-Manville Corp., 292 Madison Ave., New York City.

**PIPE CUTTING MACHINES**  
Murphy Mch. & Tool Co., 951 Porter St., Detroit.  
Newbold, R. S., & Son Co., Norristown, Pa.

**PIPE CUTTING AND THREADING MACHINES**

Aetna-Standard Eng. Co., Youngstown, O.  
Bligh & Keefer Mch. Wks., Edwardsville, Ill.

Curtis & Curtis Co., 327 Garden St., Bridgeport, Ct.

Murphy Mch. & Tool Co., 951 Porter St., Detroit.

Pipe Mach. Co., The, Cleveland.  
Saunders, D., Sons, Yonkers, N. Y.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

**PIPE FITTINGS**  
Kellogg, M. W., Co., The, 225 Bdway., N. Y. C.

**PISTON RODS**  
Heppenstall Co., Pittsburgh.

#### PLANING MACHINES—Metal

American Tool Works Co., Cincl.  
Cleveland (O.) Planer Co., The.  
Consolidated Mch. Tool Corp. of America  
Rochester, N. Y.  
Gray, G. A., Co., Cincl.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Sellers, William, & Co., Inc., Phila.

#### PLANING MACHINES—Open Side

Cleveland (O.) Planer Co., The.  
Gray, G. A., Co., Cincl.

#### PLANING MACHINES—Second Hand

Miles Mchry. Co., Saginaw, W. M., Mich.

#### PLANTS FOR SALE

Penn Seaboard Corp., Phila., Pa.

#### PLATERS' CLEANING COMPOUND

American Chemical Paint Co., Ambler, Pa.  
Oakite Products, Inc., 22 Thames St., N. Y.

#### PLATES—Feline

Wrought Washer Mfg. Co., Milwaukee.

#### PLATES—Floor or Cellar Door

Alan Wood Steel Co., Conshohocken, Pa.  
American Pressed Steel Co., Phila.  
Carnegie Steel Co., Pgh.

Central Iron & Steel Co., Harrisburg, Pa.

#### PLATES—Iron or Steel

Alan Wood Steel Co., Conshohocken, Pa.  
American Pressed Steel Co., Phila., Pa.  
Bethlehem (Pa.) Steel Company.

Carnegie Steel Co., Pittsburgh.

Central Iron & Steel Co., Harrisburg, Pa.

Illinoian Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pgh.

Newport (Ky.) Rolling Mill Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Watson-Stillman Co., 71 West St., N. Y.

Wood, R. D., & Co., Philadelphia.

Watson-Stillman Co., 71 West St., N. Y.

Watson-Stillman Co

## RAILWAY EQUIPMENT AND SUPPLIES

Foster, L. B., Co., Pittsburgh.  
John-Manville Corp., 292 Madison Ave., New York City.  
Morrison Railway Supply Corp., Buffalo, N. Y.  
Scullin Steel Co., St. Louis, Mo.  
Zehnlecker in St. Louis, Mo.

## REAMERS—Adjustable and Expansion

Barber-Colman Co., Rockford, Ill.  
Brattonay, W. L., & Bros. Co., 50 Church St., N. Y. C.  
Cleveland (O.) Twist Drill Co.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Union Twist Drill Co., Athol, Mass.  
Whitman & Barnes, Inc., Detroit, Mich.

## REFRACTORIES—See Brick—Cement—Facing Clay and Fire Clay

## REGRINDING METAL SAWS

Birmingham (Ala.) Grinding Works.

## RINGS—Iron or Steel

Akron Selle Co., Akron, Ohio.  
Edgewater Steel Co., Pittsburgh.  
Heppenstall Co., Pittsburgh.  
Milwaukee (Wis.) Forge & Mch. Co.

## RIVET MAKING MACHINERY

Aeme Machinery Co., Cleve.  
Manville, E. J., Mach. Co., Waterbury, Ct.  
National Metal Co., Tiffin, Ohio.

## RIVET SETS

Cleveland (O.) Punch & Shear Wks. Co.  
Hunter Saw & Mch. Co., 5660 Butler St., Pittsburgh.  
Marshall, Gen. F. Co., Chicago.  
Whitman & Barnes, Inc., Detroit, Mich.

## RIVETING MACHINES

Allen, John F., Co., 372 Gerard Ave., N. Y.  
Buffalo (N. Y.) Forge Co., 492 B'way.  
Hanna Engg. Works, Chicago.  
Shuster, F. B., Co., New Haven, Conn.  
Watson Stillman Co., 71 West St., N. Y.  
Wood, R. D., & Co., Philadelphia.

## RIVETS

Bethlehem (Pa.) Steel Co.  
Champion Rivet Co., Cleveland, Ohio.  
Clark Bros. Bolt Co., Milldale, Conn.  
Neely Nut & Bolt Co., Pittsburgh.  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Phane & Awood Mfg. Co., Waterbury, Conn.  
Progressive Mfg. Co., Torrington, Ct.  
Reed & Prince Mfg. Co., Worcester, Mass.  
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.  
Ryerson, Jos. T., & Son, Inc., Chicago.

## RODS—Drill

Globe Wire Company, Div. of the Firth-Sterling Steel Co., Sharpsburg, Pa.  
Pittsburgh Tool Steel Wire Co., Monaca, Pa.

## RODS—Nickel Silver

Seymour (Ct.) Mfg. Co.

## RODS—Phosphor Bronze

Phosphor Bronze Smelting Co., Phila.  
Seymour (Ct.) Mfg. Co.

## RODS—Welding

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

## RODS—Welding, Manganese Steel

Manganese Steel Forge Co., Phila.

## RODS—Wire

Washburn Wire Co., Inc., 118th & Harlem River, N. Y. C.  
Wickwire Spencer Steel Co., 41 E. 42nd St., N. Y. C.

## ROLL HEATERS—Electric

Frey Engineering Co., Chicago.

## ROLLING MACHINERY—Cold Rolling

Bliss, E. W. Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.  
Kane & Beach, Syracuse, N. Y.  
Lewis Foundry & Mach. Co., Pittsburgh.  
Yoder Co., The, Cleveland.

## ROLLING MACHINERY—Corrugating

Streine Tool & Mfg. Co., New Bremen, O.

## ROLLING MACHINERY—Sheet Leveler

Aetna-Standard Eng. Co., Youngstown, O.  
Streine Tool & Mfg. Co., New Bremen, O.

## ROLLING MACHINERY—Sheet Metal

Lewis Foundry & Mach. Co., Pittsburgh.  
Streine Tool & Mfg. Co., New Bremen, O.  
Yoder Co., The, Cleveland.

## ROLLING MACHINERY—Sheet Oiling

Aetna-Standard Eng. Co., Youngstown, O.  
Streine Tool & Mfg. Co., New Bremen, O.

## ROLLING MILL MACHINERY

Aetna-Standard Eng. Co., Youngstown, O.  
Birdsboro (Pa.) Steel Fdry. & Mch. Co.,  
Bliss, E. W. Co., 53rd St. & 2nd Ave.,  
Brooklyn, N. Y.  
Hoagland's, M., Sons Co., Rockaway, N. J.

Hyde Park (Pa.) Fdry. & Mch. Co.  
Lewis Fdry. & Mch. Co., Pittsburgh.  
National Roll & Fdry. Co., Avonmore, Pa.  
Newbold, R. S., & Son Co., Norristown, Pa.  
Quickwork Co., The (Not Incorporated)—H. Collier Smith, Owner, St. Marys, O.  
Standard Machinery Co., Auburn, R. I.  
Treadwell Engineering Co., Easton, Pa.  
United Engrg. & Fdry. Co., Pittsburgh.  
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

## ROLLING MILLS &amp; INDUSTRIAL PLANTS

Foster, Frank B., Pittsburgh, Pa.

## ROLLING MILLS—Copper Rod and Sheet

Hoagland's, M., Sons Co., Rockaway, N. J.

## ROLLS—Alloy Steel

Duquesne Steel Fdry. Co., Pittsburgh, Pa.  
United Engrg. & Fdry. Co., Pittsburgh.

## ROLLS—Bending and Straightening

Betsch & Co., Cambridge City, Ind.  
Bethlehem (Pa.) Steel Co., Buffalo (N. Y.) Forge Co., 492 B'way.  
Cleveland (O.) Punch & Shear Wks. Co.  
Hendley & Whittemore Co., Beloit, Wis.  
Lake Erie Engg. Corp., Buffalo, N. Y.  
Niagara Machine & Tool Works, Buffalo, N. Y.

Ryerson, Jos. T. & Son, Inc., Chicago.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Southward Foundry & Machine Co., Phila.

## ROLLS—Brass, Bronze, Copper, Iron, Monel, Aluminum

Paper & Textile Mchry. Co., The, Sandusky, Ohio.

## ROLLS—Galvanizing

Erie (Pa.) Forge Co.

## ROLLS—Sand Chilled Iron and Steel

Aetna-Standard Eng. Co., Youngstown, O.  
American Steel Foundries, Chicago.  
Birdsboro (Pa.) Steel Fdry. & Mch. Co., Hoagland's, M., Sons Co., Rockaway, N. J.  
Hyde Park (Pa.) Fdry. & Mch. Co.  
Lewis Fdry. & Mch. Co., Pittsburgh, Pa.  
National Roll & Fdry. Co., Avonmore, Pa.  
United Engrg. & Fdry. Co., Pittsburgh.

## ROLLS—Special Hardened

Bethlehem (Pa.) Steel Co.

## ROOFING—Cement Tile

American Cement Tile Mfg. Co., 803 Oliver Bldg., Pittsburgh.

## ROOFING—Concrete

Austin Co., The, Cleveland.

## ROOFING—Special Copper Bearing Steel

Newport (Ky.) Rolling Mill Co.

## ROOFING AND SIDING—Corrugated and Plain

Johns-Manville Corp., 292 Madison Ave., New York City.  
Newport (Ky.) Rolling Mill Co.

Ryerson, Jos. T. & Son, Inc., Chicago.

## ROOFING AND SIDING—(Genuine Open Hearth Iron)

Newport (Ky.) Rolling Mill Co.

## ROOFING AND SIDING—Iron and Steel

Newport (Ky.) Rolling Mill Co.

## RUST PREVENTIVES

American Chemical Paint Co., Ambler, Pa.

## RUST REMOVING

American Chemical Paint Co., Ambler, Pa.

## SAND—Core

Industrial Silica Corp., Youngstown, Ohio.

## SAND—Furnace Bottom

Industrial Silica Corp., Youngstown, Ohio.

## SAND—Molding

Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., N. Y. C.

## SAND—Sand Blast

Cape May (N. J.) Sand Co.  
Industrial Silica Corp., Youngstown, Ohio.  
Patch-Wegner Co., Rutland, Vt.

## SAND—Steel Molding

Cape May (N. J.) Sand Co.  
Industrial Silica Corp., Youngstown, Ohio.

## SAND BLAST EQUIPMENT AND MAINTENANCE

Arcade Mfg. Co., Freeport, Ill.  
Mott Sand Blast Mfg. Co., Inc., Chi.

Panbor Corp., Hagerstown, Md.

Sly, W. W., Mfg. Co., Cleveland, O.

National Engineering Co., Chicago.

## SAND CUTTING AND SCREENING MACHINES

Bartlett, C. O. & Snow Co., Cleveland.

## SAND HANDLING EQUIPMENT

Bartlett, C. O. & Snow Co., Cleveland.

Beardley & Piper Co., Chicago, Ill.

Hayward Co., 50 Church St., N. Y. C.

National Engineering Co., Chicago.

## SAND MILLS

Bartlett, C. O. & Snow Co., Cleveland.

National Engineering Co., Chicago.

## SAWING MACHINES—Metal

Atkins, E. C., & Co., Indianapolis, Ind.  
Cochrane-Bly Co., Rochester, N. Y.  
Earle Gear & Mch. Co., Phila.  
Espin-Lucas Mch. Works, Phila.  
Peerless Machine Co., Racine, Wis.  
Racine Tool & Mch. Co., 1755 State St., Racine, Wis.  
Tannevitz Wks., The, Grand Rapids, Mich.

## SAWS—Band and Hack for Metal

Armstrong-Blum Mfg. Co., Chicago.  
Atkins, E. C., & Co., Indianapolis, Ind.

Dission, Henry, & Sons, Inc., Phila.  
Simonds Saw & Steel Co., Fitchburg, Mass.

Tannevitz Wks., The, Grand Rapids, Mich.

## SAWS—Circular, Rip and Cutoff

Atkins, E. C., & Co., Indianapolis, Ind.  
Cochrane Bly Co., Rochester, N. Y.

## SAWS—Cold Metal

Atkins, E. C., & Co., Indianapolis, Ind.  
Hunter Saw & Mch. Co., 5660 Butler St., Pittsburgh.

## SAWS—Friction

Atkins, E. C., & Co., Indianapolis, Ind.  
Dission, Henry & Sons, Inc., Philadelphia.

## SAWS—Hack Saw Blades

Atkins, E. C., & Co., Indianapolis, Ind.  
Darwin & Milner, Inc., Cleveland.

Peerless Mch. Co., Racine, Wis.

## SAWS—Hot Metal

Atkins, E. C., & Co., Indianapolis, Ind.  
Dission, Henry & Sons, Inc., Philadelphia.

## SAWS—Inserted Tooth, Cold

Dission, Henry & Sons, Inc., Philadelphia.

## SAWS—Screw Slotting

Atkins, E. C., & Co., Indianapolis, Ind.

## SAWS—Sliding Frame

United Engrg. & Fdry. Co., Pittsburgh.

## SCALES

Buffalo (N. Y.) Scale Co., 1202 Niagara St.

## SCRAP—Iron and Steel

Perry, Buxton, Doane Co., Boston.  
Potts, Henry, & Co., Phila.

## SCREENS—Perforated Metal

Chicago Perforating Co., Chicago, Ill.  
Erdle Perforating Co., Rochester, N. Y.  
Harrington & King Perforating Co., Chi.

Hendrick Mfg. Co., Carbondale, Pa.

Mundt, Chas., & Sons, Jersey City, N. J.

## SCREENS—Woven Wire

Cleveland (O.) Wire Cloth & Mfg. Co.  
Manganese Steel Forge Co., Phila.

Michigan Wire Cloth Co., 2117 Howard St., Detroit.

Wickwire Spencer Steel Co., 41 E. 42nd, N. Y. C.

## SCREW MACHINE PRODUCTS

Barnes, Wallace, Co., The, Bristol, Ct.

Bell, David, Co., Inc., The, Buffalo, N. Y.

Clinton O. Cap Screw Co., The, New Britain, Ct.

Eastern Mch. Screw Corp., New Haven, Ct.

Hartford (Ct.) Machine Screw Co., De-

troit, Mich.

National Acme Co., The, Cleveland.

Newton Mfg. Co., Plainfield, Ct.

O'Brien Mch. Co., Phila.

Osborne & Sexton Mch. Co., Columbus, O.

Oriant, D. C. & Co., Cleveland.

Penn Seagard Corp., Phila., Pa.

Randle Mch. Co., 1772 Powers St., Cincinnati, Ohio.

Reliance Mch. Sales Co., Pittsburgh.

Ross Power Equip. Co., Indianapolis.

Russell Mch. Co., Pittsburgh.

Ryerson, Jos. T. & Son, Inc., Chicago.

Sullivan-Jones & Co., Chicago.

Suttle-Filstad Mch. Co., Dayton, O.

Sutliff Mch. Corp., Albany, N. Y.

Walsh, J. T., Buffalo, N. Y.

Zehnlecker in St. Louis, Mo.

## SEPARATORS—Gas

Research Corp., 405 Lexington Ave., N. Y. C.

## SEPARATORS—Magnetic

Dings Magnetic Separator Co., Milwaukee.

Ohio Electric Mfg. Co., Cleveland.

## SHAFTING—Cold Drawn

Cumberland (Md.) Steel Co.

Ryerson, Jos. T. & Son, Inc., Chicago.

Union Drawn Steel Co., Republic Bldg., Youngstown, Ohio.

## SHAFTING—Smooth Forged or Rough Turned

Erie (Pa.) Forge Co.

## SHAFTING—Steel

Bethlehem (Pa.) Steel Co.

Bliss & Laughlin, Inc., Harvey, Ill.

Cumberland (Md.) Steel Co.

## SHAFTING—Turned and Polished

Cumberland (Md.) Steel Co.

Jones & Laughlin Steel Corp., Pittsburgh.

Union Drawn Steel Co., Republic Bldg., Youngstown, Ohio.

## SHAPES—Cold Drawn

Union Drawn Steel Co., Republic Bldg.,

Youngstown, Ohio.

( ALL THESE COMPANIES CARRY AN AD IN THIS ISSUE )

PAGES 214-216 )

**SHAPES—Steel**

Phoenix Iron Co., Phila.  
Ryerson, Jas. T., & Sons, Inc., Chicago.

**SHAPES—Wire**

Titchener, E. H., & Co., Binghamton,  
N. Y.

**SHAPING MACHINES—Horizontal**

American Tool Works Co., Cinc.  
Continental (O) Shaper Co., The.  
Gould & Eberhardt, Newark, N. J.  
Monarch Mfg. Co., Philadelphia, Pa.  
Ryerson, Jas. T., & Sons, Inc., Chicago.  
Smith & Mills Co., Cinc.

**SHEAR BLADES AND KNIVES**

Atkins, E. C., & Co., Indianapolis, Ind.  
Heppenstall Co., Pittsburgh.  
Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.  
Yoder Co., The, Cleveland.

**SHEARING MACHINES—Alligator**

Canton (O) Fdry. & Mfg. Co.  
Doelger & Kristen, 3105 Chambers St., Mil.  
Hendley & Whittemore Co., Beloit, Wis.  
Hoagland's, M., Sons Co., Rockaway,  
N. J.

Long & Allstatter Co., Hamilton, O.  
Newbold, R. S., & Son Co., Norristown, Pa.  
Pels, Henry, & Co., 90 West St., N. Y. C.  
Smith, David H., & Sons, Inc., Foot of  
51st St., Brooklyn, N. Y.  
Thomas Spacing Mach. Co., Pgh., Pa.

**SHEARING MACHINES—Automatic**  
Alligator  
Doelger & Kristen, 3105 Chambers St., Mil.  
**SHEARING MACHINES—Bar**

Aetna-Standard Eng. Co., Youngstown, O.  
Beatty Mfg. & Mfg. Co., Hammond, Ind.  
Buffalo (N. Y.) Forge Co., 492 B'way  
Cleveland (O) Punch & Shear Wks. Co.  
Long & Allstatter Co., Hamilton, O.  
Newbold, R. S., & Son Co., Norristown, Pa.  
Pels, Henry, & Co., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Smith, David H., & Sons, Inc., Ft. of  
51st St., Brooklyn, N. Y.

**SHEARING MACHINES—Beam and Channel**

Buffalo (N. Y.) Forge Co., 492 B'way.

Morgan Engineering Co., Alliance, O.  
Pels, Henry & Co., 90 West St., N. Y. C.

Smith, David H., & Sons, Inc., Foot of  
51st St., Brooklyn, N. Y.

**SHEARING MACHINES—Billet**

Buffalo (N. Y.) Forge Co., 492 B'way.

Morgan Engineering Co., Alliance, O.  
Pels, Henry & Co., 90 West St., N. Y. C.

Smith, David H., & Sons, Inc., Foot of  
51st St., Brooklyn, N. Y.

**SHEARING MACHINES—Continuous Automatic**

Yoder Co., The, Cleveland.

**SHEARING MACHINES—Continuous Sheet & Pack**

Streine Tool & Mfg. Co., New Bremen, O.

**SHEARING MACHINES—Doubling and Squaring**

United Engrg. & Fdry. Co., Pgh.

**SHEARING MACHINES—Metal Slitting**

Buffalo (N. Y.) Forge Co., 492 B'way.

Hendley & Whittemore Co., Beloit, Wis.  
Pels, Henry & Co., 90 West St., N. Y. C.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Smith, David H., & Sons, Inc., Foot of  
51st St., Brooklyn, N. Y.

**SHEARING MACHINES—Metal Slitting Gang**

Adriance Mach. Works, Inc., 82 Richards

St., Brooklyn, N. Y.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Yoder Co., The, Cleveland.

**SHEARING MACHINES—Plate**

Bertsch & Co., Cambridge City, Ind.  
Cleveland (O) Punch & Shear Wks. Co.

Dreis & Krump Mfg. Co., Chicago.  
Long & Allstatter Co., Hamilton, O.

Morgan Engineering Co., Alliance, O.  
Newbold, R. S., & Son Co., Norristown, Pa.

Niagara Mach. & Tool Wks., Buffalo, N. Y.  
Pels, Henry & Co., 90 West St., N. Y. C.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Ryerson, Jas. T., & Sons, Inc., Chicago.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Smith, David H., & Sons, Inc., Foot of  
51st St., Brooklyn, N. Y.

Thomas Spacing Mach. Co., Pgh., Pa.

United Engrg. & Fdry. Co., Pgh.

Wood, R. D., & Co., Philadelphia.  
Yoder Co., The, Cleveland.

**SEARING MACHINES—Rotary for Irregular Cutting**

Newbold, R. S., & Son Co., Norristown, Pa.  
Quinton (O), The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Ryerson, Jas. T., & Sons, Inc., Chicago.

Yoder Co., The, Cleveland.

**SEARING MACHINES—Rotary Slitting Gang**

Streine Tool & Mfg. Co., New Bremen, O.

Yoder Co., The, Cleveland.

**SEARING MACHINES—Sheet and Plate**

Dreis & Krump Mfg. Co., Chicago.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Streine Tool & Mfg. Co., New Bremen, O.

Yoder Co., The, Cleveland.

**SEARING MACHINES—Squaring**

Dreis & Krump Mfg. Co., Chicago.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Streine Tool & Mfg. Co., New Bremen, O.

Yoder Co., The, Cleveland.

**SHET BARB**

Andrews Steel Co., Newport, Ky.

**SHET METAL MACHINERY**

Adriance Machine Wks., Inc., 82 Richards

St., Brooklyn, N. Y.

Bliss, E. W. Co., 51st St. & 2nd Ave.,

Brooklyn, N. Y.

Cincinnati (O) Shaper Co., The.

Consolidated Mach. Tool Corp. of America,

Rochester, N. Y.

Dreis & Krump Mfg. Co., Chicago.

Excelsior Tool & Mfg. Co., East St.,

Louis, Ill.

Ferracuta Machine Co., Bridgeport, N. J.

Kane & Roach, Syracuse, N. Y.

Manning, Maxwell & Moore, Inc., 100 E.

12th Street, N. Y. C.

Newbold, R. S., & Son Co., Norristown, Pa.

New Albany (Ind.) Mfg. Co.

Niagara Mach. & Tool Wks., Buffalo, N. Y.

Ohio, George A., & Co., Inc., Newark, N. J.

Quickwork Co., The (Not Incorporated)—  
H. Collier Smith, Owner) St. Marys, O.

Standard Machinery Co., Auburn, B. I.

Toledo (O) Machine & Tool Co.

V & O Press Co., Hudson, N. Y.

Yoder Co., The, Cleveland.

**SHET METAL WORK**

Champion Sheet Metal Co., Inc., Cortland,

N. Y.

Keller Blower Co., Inc., Buffalo, N. Y.

**SHET ALUMINUM**

Erdle Perforating Co., Rochester, N. Y.

**SHET AUTO BODY**

Eastern Rolling Mill Co., Balto., Md.

Empire Steel Corp., Mansfield, Ohio.

Newport (Ky.) Rolling Mill Co.

Newton Steel Co., Youngstown, Ohio.

Republic Steel Corp., Youngstown, Ohio.

**SHET BLACK**

Bethlehem (Pa.) Steel Company.

Empire Steel Corp., Mansfield, Ohio.

Inland Steel Co., Chicago.

Newport (Ky.) Rolling Mill Co.

Republic Steel Corp., Youngstown, Ohio.

Ryerson, Jas. T., & Sons, Inc., Chicago.

United Engrg. & Fdry. Co., Pgh.

**SHET BEAM**

Bethlehem (Pa.) Steel Company.

Empire Steel Corp., Mansfield, Ohio.

Inland Steel Co., Chicago.

Newport (Ky.) Rolling Mill Co.

Republic Steel Corp., Youngstown, Ohio.

Ryerson, Jas. T., & Sons, Inc., Chicago.

United Engrg. & Fdry. Co., Pgh.

**SHET BRASS**

Bethlehem (Pa.) Steel Company.

Empire Steel Corp., Mansfield, Ohio.

Inland Steel Co., Chicago.

Newport (Ky.) Rolling Mill Co.

Republic Steel Corp., Youngstown, Ohio.

Ryerson, Jas. T., & Sons, Inc., Chicago.

United Engrg. & Fdry. Co., Pgh.

**SHET COPPER**

Bethlehem (Pa.) Steel Company.

Empire Steel Corp., Mansfield, Ohio.

Inland Steel Co., Chicago.

Newport (Ky.) Rolling Mill Co.

Republic Steel Corp., Youngstown, Ohio.

Ryerson, Jas. T., & Sons, Inc., Chicago.

United Engrg. & Fdry. Co., Pgh.

**SHET COPPER STEEL**

Inland Steel Co., Chicago, Ill.

Newport (Ky.) Rolling Mill Co.

**SHET ELECTRICAL**

Empire Steel Corp., Mansfield, Ohio.

Newport (Ky.) Rolling Mill Co.

Republic Steel Corp., Youngstown, Ohio.

Ryerson, Jas. T., & Sons, Inc., Chicago.

United Engrg. & Fdry. Co., Pgh.

**SHET ENAMELING STOCK**

Empire Steel Corp., Mansfield, Ohio.

**SHET ENAMELING STOCK (Genuine Open Hearth Iron)**

Newport (Ky.) Rolling Mill Co.

**SHET DRAWING AND STAMPING**

Eastern Rolling Mill Co., Balto., Md.

Empire Steel Corp., Mansfield, Ohio.

Firth-Stirling Steel Co., McKeesport, Pa.

Newton (Ky.) Rolling Mill Co.

Newton Steel Co., Youngstown, Ohio.

Republic Steel Corp., Youngstown, Ohio.

Wheeling (W. Va.) Steel Corp.

**SHET ENAMELING STOCK**

Empire Steel Corp., Mansfield, Ohio.

Firth-Stirling Steel Co., McKeesport, Pa.

Newton (Ky.) Rolling Mill Co.

Newton Steel Co., Youngstown, Ohio.

Republic Steel Corp., Youngstown, Ohio.

Wheeling (W. Va.) Steel Corp.

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Empire Steel Corp., Mansfield, Ohio.

Firth-Stirling Steel Co., McKeesport, Pa.

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Newton Steel Co., Youngstown, Ohio.

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Firth-Stirling Steel Co., McKeesport, Pa.

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Newton Steel Co., Youngstown, Ohio.

Republic Steel Corp., Youngstown, Ohio.

Wheeling (W. Va.) Steel Corp.

**SHET ENAMELING STOCK**

October 2, 1930

**STEEL—Alloy, Cold Drawn**  
Union Drawn Steel Co., Republic Bldg., Youngstown, Ohio.

**STEEL—Bright Finished**  
Union Bright Steel Co., Republic Bldg., Youngstown, Ohio.

**STEEL—Carbon**  
Andrews Steel Co., The, Newport, Ky.  
Carnegie Steel Co., Pittsburgh.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Carbon Vanadium**  
Andrews Steel Co., The, Newport, Ky.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Chrome**  
Andrews Steel Co., The, Newport, Ky.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL—Chrome Manganese**  
Latrobe (Pa.) Electric Steel Co.  
Wheelock, Loveloy & Co., Inc., Cambridge, Mass.

**STEEL—Chrome Nickel**  
Andrews Steel Co., Newport, Ky.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL—Chrome Vanadium**  
Andrews Steel Co., Newport, Ky.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL—Cobalt**  
Darwin & Miller, Inc., Cleveland.

**STEEL—Cold Drawn**  
Bethlehem (Pa.) Steel Co.  
Biss & Laughlin, Inc., Harvey, Ill.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Globe Wire Company, Div. of the Firth-Sterling Steel Co., Sharpsburg, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Pittsburgh Tool Steel Wire Co., Monaca, Pa.  
Rathbone, A. B. & J., Palmer, Mass.  
Union Drawn Steel Co., Republic Bldg., Youngstown, Ohio.  
Wetherell Bros. Co., Cambridge, 39, Mass.

**STEEL—Cold Rolled Strips**  
Acme Steel Co., Chicago.  
American Tube & Sis. Plant (The Stanley Wks.), Bridgeport, Conn.  
Athenia Steel Co., 135 William St., N. Y.  
Cold Metal Process Co., Youngstown, Ohio.  
Giffen Mfg. Co., Erie, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Stanley Works, The, New Britain, Ct.  
Superior Steel Corp., Union Trust Bldg., Pgh.

Washburn Wire Co., Inc., 118th St. & Harlem River, N. Y. C.  
Weirton (W. Va.) Steel Co.  
West Leecburg Steel Co., Pgh.  
Wetherell Bros. Co., Cambridge, 39, Mass.  
WideWire Spencer Steel Co., 41 E. 42nd, N. Y. C.  
Worcester (Mass.) Pressed Steel Co.

**STEEL—Crucible**  
Columbus Tool Steel Co., Chicago Hts., Ill.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Vanadium-Alloys Steel Co., Latrobe, Pa.

**STEEL—Cutting**  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Wetherell Bros. Co., Cambridge, 39, Mass.

**STEEL—Die**  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Company.  
Dissin, Henry & Sons, Inc., Phila.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Heppenstall (Pa.) Pittsburgh.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL—Drill**  
Heller Bros. Co., Newark, N. J.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Electric**  
Bethlehem (Pa.) Steel Co.  
Dissin, Henry & Sons, Inc., Phila.  
Driver-Harris Co., Harrison, N. J.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Timken Roller Bearing Co., Canton, O.

**STEEL—High Speed**  
Allen, Edgar, Steel Co., Inc., 745 Washington St., N. Y. C.  
Bethlehem (Pa.) Steel Co.  
Columbia Tool Steel Co., Chicago Hts., Ill.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Heller Bros. Co., Newark, N. J.

Latrobe (Pa.) Elec. Steel Co.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Simonds Saw & Steel Co., Lockport, N. Y.  
Vanadium-Alloys Steel Co., Latrobe, Pa.  
Wheelock, Loveloy & Co., Inc., Cambridge, Mass.

**STEEL—Hot Rolled Strips**  
Acme Steel Co., Chicago.  
American Tube & Sis. Plant (The Stanley Wks.), Bridgeport, Conn.  
Barney, Wallace, Co., The, Bristol, Ct.  
Giffen Mfg. Co., Erie, Pa.  
Latrobe Steel Co., St. Louis, Mo.  
Latrobe (Pa.) Elec. Steel Co.  
Republic Steel Corp., Youngstown, Ohio.  
Stanley Works, The, New Britain, Ct.  
Superior Steel Corp., Union Trust Bldg., Pgh.  
West Leecburg Steel Co., Pgh.

**STEEL—Magnet**  
Latrobe (Pa.) Elec. Steel Co.  
Simonds Saw & Steel Co., Lockport, N. Y.

**STEEL—Manganese**  
Frog, Switch & Mfg. Co., The, Carlisle, Pa.

**STEEL—Manganese Rolled or Forged**  
Manganese Steel Forge Co., Phila.

**STEEL—Nickel**  
Andrews Steel Co., The, Newport, Ky.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL—Open Hearth**  
Andrews Steel Co., The, Newport, Ky.  
Driver-Harris Co., Harrison, N. J.  
Jones & Laughlin Steel Corp., Pgh.  
Timken Roller Bearing Co., Canton, O.

**STEEL—Rustless**  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Screw**  
Jones & Laughlin Steel Corp., Pgh.  
Timken Roller Bearing Co., Canton, O.  
Union Drawn Steel Co., Republic Bldg., Youngstown, Ohio.

**STEEL—Special Analysis**  
Andrews Steel Co., The, Newport, Ky.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Timken Roller Bearing Co., Canton, Ohio.

**STEEL—Spring**  
Athenia Steel Co., 135 William St., N. Y.  
Barney, Wallace, Co., The, Bristol, Ct.  
Bethlehem (Pa.) Steel Co.  
Republic Steel Corp., Youngstown, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Timken Roller Bearing Co., Canton, Ohio.

**STEEL—Stainless**  
Bethlehem (Pa.) Steel Co.  
Dissin, Henry & Sons, Inc., Philadelphia.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.  
Republic Steel Corp., Youngstown, Ohio.  
Simonds Saw & Steel Co., Lockport, N. Y.

**STEEL—Tool**  
Allen, Edgar, Steel Co., Inc., 745 Washington St., N. Y. C.  
Bethlehem (Pa.) Steel Co.  
Columbus Tool Steel Co., Chicago Hts., Ill.  
Dissin & Miller, Inc., Cleveland.  
Dissin, Henry & Sons, Inc., Phila.  
Firth-Sterling Steel Co., McKeesport, Pa.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Tool, Special Shapes**  
Heller Bros. Co., Newark, N. J.  
Latrobe (Pa.) Electric Steel Co.

**STEEL—Vanadium**  
Andrews Steel Co., The, Newport, Ky.  
Latrobe (Pa.) Elec. Steel Co.  
Republic Steel Corp., Youngstown, Ohio.

**STEEL PLANTS AND ROLLING MILLS**

McKee, Arthur G., & Co., Cleve.  
Perin & Marshall, 11 West 42nd St., N. Y. C.

**STEEL PLATE CONSTRUCTION**

Chicago (Ill.) Bridge & Iron Wks.  
Cole, R. D., Mfg. Co., Newnan, Ga.

**STEEL ROLLS**  
Heppenstall Co., Pittsburgh.

**STEPS—Ladder & Stair, Safety**

Blaw-Knox Co., Pittsburgh.

Columbia Tool Steel Co., Chicago Hts., Ill.

Firth-Sterling Steel Co., McKeesport, Pa.

Latrobe (Pa.) Electric Steel Co.

Timken Roller Bearing Co., Canton, O.

**STEEL ROLLS**

Heppenstall Co., Pittsburgh.

**STEPS—Safety**

Hendrick Mfg. Co., Carbondale, Pa.

#### STOCKS AND DIES

Jones & Lamson Mach. Co., Springfield, Vt.  
Saunders', D., Sons, Yonkers, N. Y.

#### STOKERS

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

#### STOPPERS—Open-Hearth, Bessemer #

Electric Furnace

McTullough Dailell Crucible Co., Pgh.

Ross-Tacony Crucible Co., Phila.

#### STOVES—Hot Blast

Brassert, H. A. & Co., Chicago.

Frey Engineering Co., Chicago.

Lakeview Furnace Co., Chicago.

Superior Steel Corp., Union Trust Bldg., Pgh.

West Leecburg Steel Co., Pgh.

#### STRAIGHTENING MACHINES

Actna-Standard Eng. Co., Youngstown, O.

Bliss, E. W. Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.

Kane & Roach, Syracuse, N. Y.

Newbold, R. S. & Son Co., Norristown, Pa.

Peis, Henry & Co., 90 West St., N. Y. C.

Thomas Spacing Mch. Co., Pgh., Pa.

#### STRAIGHTENING MACHINES—Wire

Lewis Mch. Co., The, Cleveland, Ohio.

Shuster, F. B. Co., New Haven, Ct.

#### STRUCTURAL IRON AND STEEL WORK

Austin Co., The, Cleveland.

Brimont Iron Wks., Phila.

Bethlehem (Pa.) Steel Co.

Morgan Enzg. Co., Alliance, O.

Phoenix Iron Co., Phila.

Shoemaker Bridge Co., Pottstown, Pa.

#### STRUCTURAL STEEL — See Angles, Beams, Channels and Tees

#### SUPERHEATERS

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

#### SWAGING MACHINES

Etna Machine Co., The, Toledo.

Langeler Manufacturing Co., Providence, R. I.

Quickwork Co., The (Not Incorporated—

H. Collier Smith, Owner) St. Marys, O.

Standard Machinery Co., Auburn, R. I.

Torrington (Conn.) Co.

#### SWITCHES—Electric

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

#### TACHOMETERS—Angular and Linear Velocity

Barbour-Stockwell Co., Cambridge, Mass.

#### TANKS—Compressed Air, Gas, Oil and Water

Air-Tight Steel Tank Co., Pgh.

Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

Kellogg, M. W., Co., The, 225 Bdway, N. Y. C.

Muskegon (Mich.) Boiler Wks.

Petroleum Iron Works Co., Sharon, Pa.

Sealife, Wm. B., & Sons Co., Pgh.

Smith, A. O., Corp., Milwaukee.

Westinghouse Traction Brake Co., Wilmerding, Pa.

#### TANKS—Elevated Steel

Chicago (Ill.) Bridge & Iron Wks.

Cole, R. D., Mfg. Co., Newnan, Ga.

#### TANKS—Elevated Wood

Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

Hauser-Stander Tank Co., Cincinnati.

#### TANKS—Gasoline & Oil

Chicago (Ill.) Bridge & Iron Wks.

Janney, Joseph A., Jr., Phila.

Kellogg, M. W., Co., The, 225 Bdway,

N. Y. C.

Lancaster (Pa.) Iron Works, Inc.

Sealife, Wm. B., & Sons Co., Pgh.

#### TANKS—Iron and Steel

Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

Chicago (Ill.) Bridge & Iron Wks.

Janney, Joseph A., Jr., Phila.

Kellogg, M. W., Co., The, 225 Bdway,

N. Y. C.

Hauser-Stander Tank Co., Cincinnati.

#### TANKS—Lead Lined

Gross Lead Burning & Coating Corp., Cleveland.

Hauser-Stander Tank Co., Cincinnati.

#### TANKS—Pickling

Hauser-Stander Tank Co., Cincinnati.

Wolford, G., Wood Tank Mfg. Co., Phila.

#### TANKS—Rubber Lined

Hauser-Stander Tank Co., Cincinnati.

#### TANKS—Seamless Steel

National Tube Co., Pittsburgh.

#### TANKS—Water

Hauser-Stander Tank Co., Cincinnati.

#### TANKS—Welded

Air-Tight Steel Tank Co., Pgh.

National Tube Co., Pittsburgh.

Sealife, Wm. B., & Sons Co., Pgh.

#### TANKS—Wood

Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

Hauser-Stander Tank Co., Cincinnati.

Wolford, G., Wood Tank Mfg. Co., Phila.

#### TAPPING MACHINES

Baker Bros., Inc., Toledo.

Barnes Drill Co., Inc., Rockford, Ill.

Defiance (O.) Machine Works

Langeler Manufacturing Co., Providence, R. I.

#### TAPPING MACHINES—Nuts

National Mchry. Co., Tiffin, Ohio.

#### TAPS—Collapsing

Geometric Tool Co., New Haven, Conn.

Murchey Mch. & Tool Co., 951 Porter St., Detroit.

National Acme Co., The, Cleveland.

#### TAPS AND DIES

Brubaker, W. L., & Bros., Co., 50 Church St., N. Y. C.

Morse Twist Drill & Mch. Co., New Bedford, Mass.

Murchey Mch. & Tool Co., 951 Porter St., Detroit.

National Acme Co., The, Cleveland.

#### TAR DISTILLING PLANTS

Koppers Construction Co., The, Pgh.

#### TEES—See Angles, Beams, Channels and Tees

#### TELEPHONES—Interior

Screw Machine Products Corp., Prov., R. I.

#### TESTING MACHINES—Materials

Southark Furly & Mch. Co., Phila.

#### THREAD CUTTING TOOLS—See Dies, Taps, Screw Plates, etc.

#### THREAD ROLLING MACHINES

Nilson, A. H., Mach. Co., Bridgeport, Ct.

Waterbury (Ct.) Farrel Furly & Mch. Co.

#### THREADING MACHINES

Geometric Tool Co., New Haven, Conn.

National Mchry. Co., Tiffin, Ohio.

#### TIE PLATES

Inland Steel Co., Chicago.

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**TRAILERS—Industrial**—See Trucks, Trailers—Industrial

**TRAMRAILS—Overhead Systems**

Armington Engineering Co., Euclid, O.  
Cleveland Electric Tramrail, Wickliffe, O.  
Reading (Pa.) Chain & Block Corp.  
Shepard Niles Crane & Hoist Corp.,  
Montour Falls, N. Y.

**TRAMWAYS—Wire Rope**

Broderick & Bascom Rope Co., St. Louis,  
Leschen, A. & Sons Rope Co., St. Louis.

**TRAPS—Steam and Radiator**

Johns-Manville Corp., 292 Madison Ave.,  
New York City.

Strong, Carlisle & Hammond Co., Cleve.

**TROLLEYS**

Conee Crane & Eng. Wks. Div. of H. D.  
Conkey & Co., 36 So. Jefferson St.,  
Mendota, Ill.

Hanna Engineering Works, Chicago.

Robbins & Myers, Inc., Springfield, Ohio.

Shepard Niles Crane & Hoist Corp.,

Montour Falls, N. Y.

**TROLLEYS—Monorail**

American Monorail Co., The, Cleveland.

**TRUCKS—Dump (Power)**

Crescent Truck Co., Lebanon, Pa.

**TRUCKS—Elevating (Power)**

Automatic Transportation Co., Inc., 101  
West 87th St., Chicago, Ill.

Baker-Raulang Co., Cleveland, O.

Crescent Truck Co., Lebanon, Pa.

Wright-Hibbard Industrial Elec. Truck

Co., Inc., Phelps, N. Y.

**TRUCKS—Lift (Hand and Foot)**

Lewis-Shepard Co., 122 Walnut St.,  
Watertown Station, Boston.

**TRUCKS—Steel Shop**

American Pulley Co., Philadelphia

**TRUCKS—Two Wheel Hand**

American Pulley Co., Philadelphia

Colson Co., The, Elyria, Ohio.

**TRUCKS, TRACTORS AND TRAILERS**

—Industrial

Alta Car & Mfg. Co., Cleve.  
Automatic Transportation Co., Inc., 101

West 87th St., Chicago, Ill.

Baker-Raulang Co., Cleveland, O.

Chase Fols. & Mfg. Co., Columbus, O.

Colson Co., The, Elyria, Ohio.

Crescent Truck Co., Lebanon, Pa.

Wright-Hibbard Industrial Elec. Truck

Co., Inc., Phelps, N. Y.

**TUBE EXPANDERS**

Dudgeon, Richard, Inc., 24-26 Columbia  
St., New York City.

**TUBE FORMING MACHINES**

Yoder Co., The, Cleveland.

**TUBE MILL MACHINERY**

Actna-Standard Eng. Co., Youngstown, O.  
Treadwell Engineering Co., Easton, Pa.  
United Engg. & Fdry. Co., Pittsburgh.

**TUBES—Boiler**

Babcock & Wilcox Tube Co., 85 Liberty  
St., N. Y. C.

Keating, E. F., Co., 452 Water St.,  
N. Y. C.

National Tube Co., Pittsburgh.

Pittsburgh (Pa.) Steel Products Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Spang, Chalfant & Co., Inc., Pittsburgh.

Tyler Tube & Pipe Co., The, Washington,

Pa.

Wanderman, H. L., Co., The, 1440  
Broadway, New York City.

**TUBES—Boiler, Charcoal Iron**

Bethlehem (Pa.) Steel Co.

Keating, E. F., Co., 452 Water St., N. Y.

Tyler Tube & Pipe Co., Washington, Pa.

**TUBES—Nickel Silver**

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

**TUBING—Aluminum, Seamless**

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

**TUBING—Brass, Bronze, Copper, Monel,**

Aluminum (Centrifugally Cast)

Paper & Textile Machy. Co., The, San-  
dusky, Ohio.

**TUBING—Brass, Bronze, Copper or Nickel**

Silver

Service Steel Co., Detroit.

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

Wolverine Tube Co., Detroit.

**TUBING—Chrome Alloy**

Delaware Seamless Tube Co., The, Au-  
burn, Pa.

**TUBING—Cylinder Finish**

Delaware Seamless Tube Co., The, Au-  
burn, Pa.

**TUBING—Phosphor Bronze**

Phosphor Bronze Smelting Co., Phila.

**TUBING—Seamless Steel**

Babcock & Wilcox Tube Co., 85 Liberty

St., N. Y. C.

Cleveland (O.) Tool & Supply Co.

Delaware Seamless Tube Co., The, Au-  
burn, Pa.

Jones & Laughlin Steel Corp., Pgh.

Keating, E. F., Co., 452 Water St.,  
N. Y. C.

National Tube Co., Pittsburgh.

Pittsburgh (Pa.) Steel Products Co.

Spang, Chalfant & Co., Inc., Pittsburgh.

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

Wanderman, H. L., Co., The, 1440

Broadway, New York City.

Timken Roller Bearing Co., Canton, Ohio.

Wanderman, H. L., Co., The, 1440

Broadway, New York City.

Yoder Co., The, Toledo.

**TUBING—Square and Rectangular**

National Tube Co., Pittsburgh.

Service Steel Co., Detroit.

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

**TUBING—Stainless Iron**

Spang, Chalfant & Co., Inc., Pittsburgh.

**TUBING—Welded Steel**

National Tube Co., Pittsburgh.

Service Steel Co., Detroit.

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

**TUMBLING BARRELS**

Baird Machine Co., Bridgeport, Ct.

Globe Mach. & Stpg. Co., Cleveland.

Ransohoff, N. Inc., Cinn., Ohio.

Sly, W. W., Mfg. Co., Cleveland, O.

**TURBINES**

De Laval Steam Turbine Co., Trenton, N. J.

**TURNTABLES**

Canton (O.) Fdry. & Mach. Co.

**TWIST DRILLS**

Cleveland (O.) Twist Drill Co.

Morse Twist Drill & Mch. Co., New Bed-  
ford, Mass.

Union Twist Drill Co., Athol, Mass.

Whitman & Barnes, Inc., Detroit, Mich.

**TYPE—Steel**

Noble & Westbrook Mfg. Co., Hartford,  
Ct.

**UNIONS**

Dart, E. M., Mfg. Co., Prov., R. I.

**VALVES—Air Operating**

Galland-Henning Mfg. Co., Milwaukee.

Westinghouse Traction Brake Co., Wil-  
merding, Pa.

**VALVES—Blast Furnace**

Frey Engineering Co., Chicago.

**VALVES—Gas and Air Reversing**

Swindell-Dressler Corp., Box 1753, Pgh.

**VALVES—Gas, Water and Steam**

Wood, R. D., & Co., Philadelphia.

**VALVES—Hydraulics**

Anker Engng. Co., Phila.

Birleshaw (Pa.) Steel Fdry. & Mch. Co.

Galland-Henning Mfg. Co., Milwaukee.

Southwark Fdry & Mch. Co., Phila.

Watson-Stillman Co., The, 71 West St.,  
N. Y. C.

Wood, R. D., & Co., Philadelphia.

**VALVES—(Pressure Seated) Pneumatic**

Cleveland (O.) Pneumatic Tool Co., The.

**VISES—Machine, Compensating**

Ayer Drilling Mch. Co., Cincinnati, O.

**WASHERS—Bevel**

Nicetown Plate Washer Co., Inc., Phila.

**WASHERS—Iron or Steel**

Bethlehem (Pa.) Steel Co.

Central Iron & Steel Co., Harrisburg, Pa.

Griffin Mfg. Co., Erie, Pa.

Hager, C. & Sons Hinge Mfg. Co., St.

Louis, Mo.

Joliet (Ill.) Wrought Washer Co.

Master Products Co., The, 6420 Park Ave.,  
S. E., Cleveland, O.

Nicetown Plate Washer Co., Inc., Phila.

Shakeproof Lock Washer Co., Chicago.

Smith, Thomas, Co., 286 Grove St.,  
Worcester, Mass.

Wrought Washer Mfg. Co., Milwaukee.

**WASHERS—Leather**

Chicago (Ill.) Rawhides Mfg. Co., 1318

Eaton Ave.

Graton & Knight Co., Worcester, Mass.

**WASHERS—Lock**

Shakeproof Lock Washer Co., Chicago.

**WASHERS—Special**

Shakeproof Lock Washer Co., Chicago.

**WASHERS—Spring Steel**

Dunbar Bros. Co., Bristol, Ct.

**WASHERS—Tempered**

Barnes, Wallace, Co., The, Bristol, Ct.

**WASHING MACHINES—For Metal Parts**

Detroit (Mich.) Sheet Metal Wks.

Meeker Co., The, Chicago.

Ransohoff, N. Inc., Cinn., Ohio.

**WATER-COOLED EQUIPMENT FOR OPEN-HEARTH FURNACES**

Blaw-Knox Co., Pittsburgh.

**WATER SOFTENERS AND PURIFIERS**

Scaife, Wm. B., & Sons Co., Pgh.

**WELDING—Electric**

Agnew Elec. Welder Co., Milford, Mich.

Brown Bros. Co., Pittsburgh

Service Steel Co., Detroit.

Summerill Tubing Co., Bridgeport, Mont-  
gomery County, Pa.

**WELDING—Forge & Hammer**

Blaw-Knox Co., Pittsburgh

**WELDING—Oxy-Acetylene**

Blaw-Knox Co., Pittsburgh

**WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene**

Air Reduction Sales Co., 60 East 42nd

St., N. Y. C.

Imperial Brass Mfg. Co., 1210 W. Harri-

son St., Chicago, Ill.

**WELDING MACHINES—Butt**

Agnew Elec. Welder Co., Milford, Mich.

Federal Mch. & Welder Co., Warren, O.

Swift Electric Welder Co., Blvd Temple

Bldg., West Grand Blvd. at 12th St.,  
Detroit.

Taylor-Winfield Corp., The, Warren, O.

Thomson-Gibb Electric Welding Co., 661

Pleasant St., Lynn, Mass.

**WELDING MACHINES—(Electric Arc) Second Hand**

Taylor-Hall Welding Corp., 5 May St.,  
Worcester, Mass.

**WELDING MACHINES—Seam**

Federal Mch. & Welder Co., Warren, O.

Taylor-Winfield Corp., The, Warren, O.

**WELDING MACHINES—Spot**

Goodman Elec. Mach. Co., Newark, N. J.

Lincoln Electric Co., Cleveland.

**WELDING MACHINES—**

# Advertisers Index

**A**

Abbott Ball Co., Inc.....101  
Abendroth & Root Mfg. Co.....130  
Abrasive Mch. Tool Co.....57  
Acme Machinery Co.....61  
Acme Stpg. & Mfg. Co.....197  
Acme Steel Co.....129  
Adriance Mach. Works, Inc.....71  
Aetna-Standard Engg. Co.....101  
Agnew Electric Welder Co.....82  
Air Reduction Sales Co.....79  
Air-Tight Steel Tank Co.....120  
Akron Gear & Engine Co.....108  
Akron-Selle Co., The.....150  
Alan Wood Steel Co.....135, 187  
Albert & Davidson Pipe Corp.....195  
Albert Pipe Supply Co., Inc.....195  
Allen, Edgar, Steel Co., Inc.....126  
Allen, John F., Co.....78  
Allen Mfg. Co., The.....157  
Alliance Machine Co., The.....90  
Allis-Chalmers Mfg. Co.....178  
American Broach & Mach. Co.....56  
American Cement Tile Mfg. Co.....121  
American Chemical Paint Co.....172  
American Crane Co., Inc.....90  
American Crusher & Machinery Corp.....188  
American Electric Furnace Co.....176  
American Engineering Co.....93  
American Fluid Motors Co.....73  
American Gas Furnace Co.....176  
American Manganese Bronze Co.....147  
American Manganese Steel Co.....143  
American MonoRail Co., The.....92  
American Pipe Bending Mch. Co.....78  
American Pressed Steel Co.....186  
American Pulley Co.....147  
American Pulverizer Co.....188  
American Roller Bearing Co.....155  
American Spiral Spring & Mfg. Co.....170  
American Spring & Mfg. Corp.....170  
American Steel Foundries.....143, 144  
American-Terry-Derrick Co.....93  
American Tool Works Co.....54  
Ames, W., & Co.....159  
Ans, Max, Mch. Co., The.....196  
Andes, Inc.....198  
Andrews Steel Co.....121  
Anker Engineering Co.....179  
Anthony Co.....176  
Apex Tool Co., Inc.....66  
Arcade Mfg. Co.....98  
Archer & Baldwin, Inc.....193  
Armel, James P.....194  
Armington Engg. Co.....88  
Armstrong-Blum Mfg. Co.....60  
Armstrong Bros. Tool Co.....52  
Athenia Steel Co., The.....126  
Atkins, E. C., & Co.....64  
Atlas Brass Fdry. Co.....198  
Atlas Car & Mfg. Co.....98  
Atlas Drop Forge Co.....141  
Atlas Steel Casting Co.....143  
Auburn Ball Bearing Co.....156  
Austin Co., The.....120  
Automatic Transportation Co., Inc.....97  
Avey Drilling Mch. Co.....54, 60

**B**

Babcock & Wilcox Co., The.....133  
Baird Machine Co.....99

Baker Bros., Inc.....54	Caldwell, H. W., & Son Co.....4	Cutler-Hammer, Inc.....117
Baker, J. E., Co.....133	Caldwell, W. E., Co.....118	Cuyahoga Spring Co.....168
Baker Raulang Co.....24	Calumet Electric Casteel Co.....144	
Bantam Ball Bearing Co.....156	Cann & Saul Steel Co.....140	
Barber-Colman Co.....60	Canter Forge & Axle Co.....141	
Barbour-Stockwell Co.....118	Canton Fdry. & Mch. Co.....92	
Bardons & Oliver.....58	Cape May Sand Co.....100	
Barnes Drill Co., Inc.....46	Carborundum Co.....50	
Barnes-Gilson-Raymond, Inc.....20	Carnegie Steel Co.....187	
Barnes, Wallace, Co., The.....20	Cattie, Joseph P., & Bros.....199	
Barnes, W. F. & John, Co.....54	Cavagnaro, John J.....196	
Bartlett, C. O., & Snow Co.....98	Central Iron & Steel Co.....187	
Bascom & Co.....198	Century Electric Co.....116	
Bay City Forge Co.....140	Century Wood Preserving Co.....187	
Beardsley & Piper Co.....188	Chambersburg Engng. Co.....118	
Beardsley & Woleott Mfg. Co.....197	Champion Blower & Forge Co.....172	
Beatty Mch. & Mfg. Co.....74	Champion Rivet Co., The.....162	
Bedford Fdry. & Mch. Co.....88	Champion Sheet Metal Co., Inc.....147	
Behringer, E., Sheet Metal Wks., Inc.....197	Chase Fdry. & Mfg. Co.....96	
Belden Machine Co.....143	Chateaugay Ore & Iron Co.....137	
Bell, David, C., Inc., The.....159	Chicago Bridge & Iron Wks.....118	
Bellveue Industrial Furnace Co.....177	Chicago Perforating Co.....153	
Belmont Iron Works.....121	Chicago Rawhide Mfg. Co.....108	
Belyea Co., Inc.....194	Cincinnati Bickford Tool Co.....46	
Berger, L. D., Co.....197	Cincinnati Electrical Tool Co., The.....57	
Bernard Service.....201	Cincinnati Lathe & Tool Co.....54	
Bertsch & Co.....73	Cincinnati Shaper Co.....26	
Best, W. N., Corp.....172	Cincinnati Steel Castings Co.....143	
Bethlehem Steel Co.....25	Clapp, E. D., Mfg. Co., The.....141	
Bignall & Keebler Mach. Works.....59	Clark Bros. Bolt Co.....159	
Birdsboro Steel Fdry. & Mch. Co.....72	Clark Controller Co.....115	
Birrell Iron Works.....121	Clearing House Section.....190-195	
Bixby, R. W., Inc.....201	Cleveland Can Screw Co.....156	
Black & Decker Mfg. Co., The.....57	Cleveland Cliffs Iron Co.....135	
Blanchard Mach. Co., The.....57	Cleveland Crane & Engng. Co.....88	
Blaw-Knox Co.....104	Cleveland Electric Tramrail.....88	
Bliss, E. W., Co.....102	Cleveland Hardware Co.....142	
Bliss & Laughlin, Inc.....121	Cleveland Planer Co.....49	
Booth Felt Co., Inc., The.....179	Cleveland Pneumatic Tool Co., The.....66	
Bossert Corp.....149	Cleveland Punch & Shear Wks., Co.....16	
Boston Gear Works Sales Co.....110	Cleveland Quarries Co.....57	
Box Crane & Hoist Corp.....89	Cleveland Tool & Supply Co.....133	
Boyle, John, Jr.....200	Cleveland Twist Drill Co.....60	
Brassert, H. A., & Co.....121	Cleveland Wire Cloth & Mfg. Co.....164	
Breese Bros. Co.....150	Cleveland Wire Spring Co.....168	
Bridgeport Brass Co.....150	Cleveland Worm & Gear Co.....108	
Bridgeport Safety Emery Wheel Co., Inc., The.....58	Clifton Mchry. Co.....193	
Bristol Co., The.....177	Cochrane-Bly Co.....58	
Broderick & Bascom Rope Co.....168	Cohen, Louis, & Son.....195	
Brown & Sharpe Mfg. Co., Inc.....30	Cold Finished Steel Bar Industry.....127	
Brownell Mchry. Co.....192	Cold Metal Process Co., The.....130	
Browning Crane Co., The.....93	Cole, R. D., Mfg. Co.....120	
Browning, Victor R., Co., Inc.....88	Colson Co., The.....96	
Brunbaker, W. L., & Bros. Co.....62	Columbia Tool Steel Co.....126	
Buckeye Brass & Mfg. Co.....153	Commercial Steel Casting Co., The.....145	
Budd-Ranney Engng. Co., The.....82	Conco Crane & Engng. Wks., Div. of H. D. Conkey & Co., Inc.....88	
Buffalo Bolt Co.....159	Cone Automatic Mach. Co., Inc.....54	
Buffalo Bronze Die Cast Corp.....198	Connecticut Fdry. Co., The.....198	
Buffalo Forge Co.....103	Consolidated Mach. Tool Corp., of America.....47	
Buffalo Scale Co.....88	Continental Felt Co.....179	
Buffalo Wire Wks. Co., Inc.....164	Continental Iron & Steel Co.....195	
Bullard Co., The.....45	Contract Work Section.....196-199	
Bunting Brass & Bronze Co.....22	Cook, Asa S., Co.....84	
Burgess-Norton Mfg. Co.....197	Cook, H. C., Co.....196	
Bury Compressor Co.....179	Cook Spring Div. of Barnes-Gibson-Raymond, Inc.....20	
Business Opportunities Section.....199-200	Corbin Screw Corp.....158	
	Cowdrey, C. H., Mach. Co.....196	
	Crescent Truck Co.....98	
	Crucible Steel Casting Co., Ohio.....143	
	Crucible Steel Castings Co., Pa.....143	
	Cumberland Steel Co.....126	
	Curtis & Curtis Co.....58	

**D**

Dale Engine Co.....178  
Dart, E. M., Mfg. Co.....188  
Darwin & Milner, Inc.....128  
Davis Brake Beam Co.....197  
Defiance Machine Works.....56  
De Laval Steam Turbine Co.....178  
Delaware Seamless Tube Co.....133  
Delta Equipment Co.....191  
Densite Corp. of America.....33  
Detroit Electric Furnace Co.....176  
Detroit Hoist & Mach. Co.....93  
Detroit Metal Specialty Corp.....147  
Detroit Sheet Metal Works.....187  
Dickinson, Thos. L.....64  
Dings Magnetic Separator Co.....100  
Dissston, Henry, & Sons, Inc.....64  
Divine Bros. Co.....64  
Doelger & Kirsten.....73  
Donahue Steel Prods. Co., Inc.....193  
Dony, D. E.....192  
Dreis & Krump Mfg. Co.....74  
Driver-Harris Co.....122  
Drying Systems, Inc.....177  
Dudgeon, Richard, Inc.....72  
Duff Patents Co., Inc.....120  
Duluth Iron & Metal Co.....195  
Dunbar Bros. Co.....19  
Dundore Mfg. Co.....108  
Duquesne Steel Fdry. Co.....143

**E**

Earle Gear & Mach. Co.....108  
Eastern Machine Screw Corp.....64  
Eastern Mchry. Co.....191  
Eastern Rolling Mill Co., The.....128  
Eastern Tool & Stpg. Co., Inc.....197  
Economy Engng. Co., The.....58  
Economy Furnace Co.....176  
Edge Hill Silica Rock Co.....137  
Edgewater Steel Co.....140  
Electric Boat Co.....198  
Electric Controller & Mfg. Co.....92  
Electric Furnace Co.....176  
Electro Metallurgical Sales Co.....139  
Elmes, Chas. F., Engng. Wks.....73  
Empire Steel Corp.....12-13  
Employment Exchange.....201-202  
Erdle Perforating Co.....153  
Erie Bronze Co.....146  
Erie Forge Co.....142  
Erie Steel Construction Co.....194, 195  
Espin-Lucas Mach. Works, The.....58  
Essley, E. L., Mchry. Co.....192  
Etna Machine Co., The.....86  
Euclid Crane & Hoist Co., The.....88  
Evans Friction Cone Co.....106  
Excelsior Tool & Mch. Co.....74  
Eyster, Weiser Co.....198

**C**

Cadman, A. W., Mfg. Co.....198  
Calder, Geo. II.....64

**F**

Fabricated Steel Prods. Co.....196  
Falk Corp., The.....111-112  
Farrell Mchry. Co.....193  
Federal Mch. & Welder Co.....81  
Felters Co., Inc., The.....179

# Advertisers Index

Ferguson Gear Co.....	108	Heppenstall Co. ....	142	Konigsow, Otto, Mfg. Co., The.....	147	Morgan Engineering Co., The.....	91
Ferracute Machine Co.....	68	Herman Pneumatic Mch. Co....	98	Koppers Construction Co.....	2	Morris Machine Works .....	179
Firth-Sterling Steel Co.....	128	Hevi Duty Electric Co.....	176			Morrison Railway Supply Corp.,	195
Fischer, Charles, Spring Co.....	170	Highway Truck Parts Co.....	193			Morse Twist Drill & Mch. Co.,	63
Flinn & Drefein Co.....	17	Hill, Clarke & Co. of Chicago..	190			Motor Repair & Mfg. Co.....	194
Foot Bros. Gear & Mch. Co.....	109	Hill Clutch Mch. & Fdry. Co.,				Mott Sand Blast Mfg. Co., Inc.	101
Ford, J. B. Co., The.....	172	The .....	196			Mullins Mfg. Corp.....	147
Forest City-Walworth Run		Hill, N. N., Brass Co., The.....	197			Mundt, Chas., & Sons.....	152
Fdries. Co.....	146	Hillman Coal & Coke Co.....	136			Murchey Mch. & Tool Co.....	64
Foster, Frank B.....	193	Hindley Gear Co.....	108			Muskegon Boiler Wks.....	119
Foster, L. B. Co.....	195	Hindley Mfg. Co.....	168			Myers, F. E. & Bro. Co.....	179
Frank, M. K.....	195	Hoagland's, M. Sons Co.....	105	L			
Franklin Mfg. Co.....	84	Hoggson & Pettis Mfg. Co., The.....	186	L. & D. Pipe Supply Co., Inc.	195	National Acme Co., The.....	158
Fredericksen Co.....	154	Holcroft & Co.....	176	Laclede Steel Co.....	130	National Alloy Steel Co.....	143
French Oil Mill Mchry. Co.....	72	Horsburgh & Scott Co.....	114	Lake Erie Engineering Corp....	72	National Engineering Co.....	100
Freyen Engineering Co.....	32	Hoskins Mfg. Co.....	217	Lakeside Bridge & Steel Co.....	92	National Forge & Ordnance Co.	137
Frog Switch & Mfg. Co., The..	143	Hubbard, M. D., Spring Co.....	168	Lambert & Todd Machine Co.....	196	National Mchry. Co.....	118
Froment & Co.....	193	Hudson Pipe & Supply Co.....	195	Lancaster Iron Works, Inc.....	119	National Roll & Fdry. Co.....	101
		Huebel Mfg. Co.....	197	Landis Tool Co. ....	55	National Tube Co. ....	131
G		Hunter Pressed Steel Co.....	168	Langelier Mfg. Co. ....	85	Nazel Engng. & Mch. Works..	118
Galland-Henning Mfg. Co.....	183	Hunter Sav & Mch. Co.....	64	Lansing Stamping Co. ....	147	Neely Nut & Bolt Co.....	162
Gardner Machine Co.....	57	Hurlbut Rogers Mchry. Co.,		Lapointe Mach. Tool Co. ....	56	New Albany Mch. Mfg. Co. ....	67
Gehring Oven Co., Inc.....	177	The .....	58	Latrebe Elec. Steel Co. ....	121	New Departure Mfg. Co. ....	42
General Drop Forge Co.....	143	Hyde Park Fdry. & Mch. Co. ....	106	Laughlin, Alex., & Co. ....	121	New England Pressed Steel Co.	147
General Electric Vapor Lamp		Hyman, Joseph, & Sons.....	191	Lavino, E. J., & Co. ....	137	N. Y. Belting & Packing Co. ....	106
Co. ....	48	Hyman-Michaels Co.....	194	LeBlond, R. K., Mch. Tool Co. ....	54	Newark Malleable Iron Works..	144
General Machine Works.....	196	Hyro Mfg. Co.....	173	Lee Spring Co., Inc. ....	168	Newbold, R. S., & Son Co. ....	73
General Mch. & Mfg. Co.....	197	I		Leland Electric Co. ....	118	Newport Rolling Mill Co. ....	128
General Mchry. Corp.....	192	Ideal Mchry. Co.....	191	Leland-Gifford Co. ....	46	Newton Die Casting Corp. ....	8
General Refractories Co.....	138	Illinois Steel Warehouse Co....	122	Leschen, A., & Sons Rope Co. ....	168	Newton Mfg. Co. ....	198
Geometric Tool Co., The.....	62	Independent Pneumatic Tool Co. ....	66	Lewis Fdry. & Mch. Co. ....	106	Newton Steel Co. ....	128
Geuder, Paeschke & Frey Co. ....	148	Indianapolis Drop Forging Co. ....	142	Lewis Mch. Co., The.....	84	Niagara Mach. & Tool Works..	68
Gibson, Wm. D., Co.....	20	Industrial Brownhoist Corp....	23	Lewis-Shepard Co. ....	96	Nicetown Plate Washer Co., Inc.	164
Globe Mch. & Stpg. Co.....	150	Industrial Silica Corp.....	98	Lincoln Electric Co. ....	80	Nicholls, W. H., Co., Inc. ....	98
Globe Wire Co.....	128	Industrial Steel Casting Co. ....	31	Littell, F. J., Mch. Co. ....	67	Noble & Westbrook Mfg. Co. ....	186
Goodman Electric Mchry. Co. ....	194	Inland Steel Co.....	37	Llewelyn, Thomas J., & Co. ....	120	Noble Mchry. Co., Inc. ....	192
Gould & Eberhardt.....	57	International Nickel Co., The. ....	134	Lodge & Shipley Mch. Tool Co. ....	192	North Wales Machine Co. ....	198
Grant Gear Works.....	108	J		Logansport Mch. Co., The.....	66	Northern Engineering Works...	94
Gratton & Knight Co.....	220	Janney, Joseph A., Jr. ....	119	Long & Allstatter Co. ....	68	Northern Malleable Iron Co. ....	146
Gray, G. A., Co.....	57	Jefferson Electric Co. ....	5	Lucas Mach. Tool Co. ....	56	Norton Co. ....	65
Great Lakes Pressed Steel Corp. ....	197	Jennison-Wright Co. , The.....	187	Luers Bros. Mchry. & Tool Co. ....	198		
Greenpoint Iron & Pipe Co., Inc. ....	195	Johns-Manville Corp. ....	185	Lumen Bearing Co. ....	147	O	
Griffin Mfg. Co.....	130	Johnson, Wm. C., & Sons Mchry.		Lummis & Co. ....	193	Oakite Products Co., Inc. ....	53
Gross Lead Burning & Coating		Co. ....	193	McAleer Mfg. Co. ....	171	O'Brien Mchry. Co., Inc. ....	192, 194
Corp. ....	119	Johnson Steel & Wire Co., Inc. ....	164	MacCabe, T. B. ....	194	Ohio Electric Mfg. Co. ....	92
		Joliet Wrought Washer Co. ....	164	McClintic-Marshall Co. ....	120	Ohio Locomotive Crane Co. ....	92
H		Jones & Lamson Mach. Co. ....	54	McCullough-Dalzell Crucible Co. ....	101	Oliver Iron & Steel Corp. ....	160-161
Hagan, George J., Co. ....	176	Jones & Laughlin Steel Corp. ....	18	McKee, Arthur G., & Co. ....	121	Orton Crane & Shovel Co. ....	92
Hager, C., & Sons Hinge Mfg.		Jones, W. A., Fdry. & Mch. Co. ....	113	Machinery Forging Co., The. ....	142	Osborne & Sexton Mchry. Co. ....	192
Co. ....	153	Kane & Roach.....	74	Magnetic Mfg. Co. ....	100	Ottemiller, Wm. H., Co., Inc. ....	159
Hanna Engr. Works.....	78, 93	Kardong Bros., Inc.....	78	Malleable Iron Fittings Co. ....	146	Oviatt, D. C. & Co. ....	193
Hanna Furnace Corp., The.....	135	Kearney & Trecker Corp.....	56	Mallory Mchry. Corp. ....	195	Owen Bucket Co., The. ....	86
Harbison - Walker Refractories		Keating, E. F., Co. ....	133	Manganese Steel Forge Co. ....	121	P	
Co. ....	137	Kelker Blower Co., Inc. ....	197	Manistein Iron Works Co. ....	179	Page Steel & Wire Co. ....	164
Harnischfeger Corp. ....	88, 92	Keller Mechanical Engng. Corp. ....	58	Manning, Maxwell & Moore, Inc. ....	88	Pangborn Corporation .....	100
Harrington & King Perforating		Kellogg, M. W., Co., The. ....	119	Manville, E. J., Machine Co. ....	82	Paper & Textile Machy. Co.,	
Co. ....	152	Kennedy, Julian .....	120	Marchant, Geo. F., Co. ....	67	The .....	132
Harrington Co., The.....	93	Keystone Forging Co. ....	142	Meaker Co., The. ....	51	Parish Pressed Steel Co. ....	151
Harrison, H. H., Inc.....	201	Kilborn & Bishop Co., The. ....	142	Meehan Boiler & Const. Co. ....	120	Parkersburg Rig & Reel Co.,	
Harsch, John, Bronze & Fdry.		Kingsbury Mach. Tool Corp. ....	46	Meeker Fdry. Co. ....	144	Inc. ....	199
Co., The .....	144	Kinnear Mfg. Co. ....	189	Merrill Mfg. Co. ....	58	Patch-Wegner Co., Inc. ....	98
Hartford Machine Screw Co.....	198	Kline Hardware Co. ....	198	Metal Specialty Co., The. ....	147	Patent Specialty Supply Co., Inc.	197
Hartford Special Mchry. Co.,				Michigan Wire Cloth Co. ....	164	Paul, W. P., Co. ....	199
The .....	108, 196			Miles Machinery Co. ....	191		
Hassall, John, Inc.....	199			Miller & Van Winkle, Inc. ....	170		
Hauck Mfg. Co.....	176			Milne, A., & Co. ....	128		
Hauser-Stander Tank Co.....	119			Milwaukee Elec. Crane & Hoist			
Hayward Co., The.....	87			Corp. ....	86		
Hazard Wire Rope Co.....	169			Milwaukee Forge & Mch. Co. ....	140		
Hegeler Zinc Co.....	133			Minster Machine Co., The. ....	68		
Heller Bros. Co.....	126			Moloch Fdry. & Mch. Co. ....	118		
Helwig Mfg. Co.....	67			Monarch Mch. Tool Co., The. ....	54		
Hendley & Whittemore Co.....	74			Monarch Mchry. Co. ....	192		
Hendrick Mfg. Co.....	153, 184			Morey & Co., Inc. ....	191		

# Advertisers Index

Payne, N. B., & Co. .... 194  
 Peerless Mch. Co. .... 60  
 Pels, Henry, & Co., Inc. .... 73  
 Penn Fdry. & Mfg. Co. .... 198  
 Penn, Jacob, Inc. .... 201  
 Penn Jersey Metal Prods. Corp. .... 197  
 Penn Screw & Mch. Works. .... 198  
 Penn Seaboard Corp. .... 199  
 Pennsylvania Car Co. .... 197  
 Pennsylvania Engng. Wks. .... 121  
 Pennsylvania Pump & Compre-  
 sor Co. .... 179  
 Peoria Malleable Castings Co. .... 144  
 Perin & Marshall. .... 121  
 Perry, Buxton, Doane Co., The. .... 195  
 Personnel Extension Bureau. .... 201  
 Petroleum Iron Works Co. .... 119  
 Philadelphia Gear Works. .... 108  
 Philadelphia Hardware & Malle-  
 able Iron Works, Inc. .... 159  
 Philadelphia Steel & Iron Co. .... 142  
 Phoenix Iron Co. .... 126  
 Phosphor Bronze Smelting Co. .... 3  
 Pickands, Mather & Co. .... 136  
 Pilling & Co., Inc. .... 135  
 Pipe Machinery Co. .... 58  
 Pittsburgh Elec. Furnace Corp. .... 176  
 Pittsburgh Forge & Iron Co. .... 128  
 Pittsburgh Metallurgical Co., Inc. .... 137  
 Pittsburgh Steel Prods. Co. .... 36  
 Pittsburgh Tool Steel Wire Co. .... 128  
 Platt Bros., & Co., The. .... 133  
 Plume & Atwood Mfg. Co. .... 162  
 Plymouth Locomotive Works. .... 96  
 Poole Engng. & Mach. Co. .... 106  
 Portable Machinery Co. .... 86  
 Potts, Henry, & Co. .... 196  
 Prentiss, Geo. W., & Co. .... 164  
 Pressed & Welded Steel Prods.  
 Co. .... 197  
 Production Machine Co. .... 57  
 Progressive Mfg. Co. .... 156

## Q

Quickwork Co., The (Not Incor-  
 porated—H. Collier Smith,  
 owner) .... 74

## R

Racine Tool & Mch. Co. .... 58  
 Randle Mchry. Co. .... 194  
 Ransohoff, N., Inc. .... 100  
 Rathbone, A. B. & J. .... 158  
 Raymond Mfg. Co. .... 20  
 Reading Chain & Block Corp. .... 92  
 Reed-Prentiss Corp. .... 46  
 Reed & Prince Mfg. Co. .... 157  
 Reliance Machinery Sales Co. .... 192  
 Republic Steel Corp. .... 9  
 Research Corp. .... 124  
 Rhoades, R. W., Metaline Co.,  
 Inc. .... 153  
 Rhode Island Tool Co. .... 162  
 Richards, I. P. Co. .... 67  
 Richmond Forgings Corp. .... 193  
 Richmond Malleable Castings Co. .... 146  
 Ridgway, Craig, & Son Co. .... 86  
 Rivett Lathe & Grinder Corp. .... 66  
 Robbins & Myers, Inc. .... 92  
 Robertson, John, Co., Inc. .... 73  
 Rockford Drop Forge Co. .... 141  
 Rockford Iron Wks. .... 72  
 Rockwell, W. S., Co. .... 176  
 Roebling's, J. A., Sons Co. .... 165-166

Roeper Crane & Hoist Works,  
 Inc. .... 93  
 Rogers Brown & Crocker Bros.,  
 Inc. .... 137  
 Rollway Bearing Co., Inc. .... 156  
 Ross Power Equip. Co. .... 194  
 Ross-Tacony Crucible Co. .... 101  
 Roversford Fdry. & Mch. Co.,  
 Inc. .... 198  
 Russell, Burdsall & Ward Bolt  
 & Nut Co. .... 27  
 Russell Mch. Co. .... 192  
 Ryerson, Jos. T., & Son, Inc. .... 40

## S

Safety Grinding Wheel & Mach.  
 Co. .... 64  
 St. Paul Corrugating Co. .... 197  
 Samuel, Frank, & Co. .... 137  
 Saunders, D., Sons, Inc. .... 58  
 Scaife, Wm. B., & Sons Co. .... 119  
 Schatz Mfg. Co., The. .... 77  
 Schoonmaker, A. G. & Sons, Inc. .... 193  
 Schwerite Stamp Co., The. .... 186  
 Screw Machine Products Corp. .... 158  
 Scullin Steel Co. .... 122  
 Scully-Jones & Co. .... 194  
 Seifreat-Elstad Mchry. Co. .... 191  
 Sellers, Wm., & Co., Inc. .... 38  
 Semet-Solvay Co. .... 10  
 Seneca Iron & Steel Co. .... 128  
 Service Steel Co. .... 133  
 Sessions Foundry Co., The. .... 146  
 Seymour Mfg. Co., The. .... 135  
 Seymour Products Co., The. .... 147  
 Shakeproof Lock Washer Co. .... 163  
 Shenango-Penn Mold Co. .... 156  
 Shepard Niles Crane & Hoist  
 Corp. .... 95  
 Sherwood, E. C. .... 195  
 Shimer, Samuel J., & Sons, Inc. .... 158  
 Shoemaker Bridge Co. .... 120  
 Shore Instrument & Mfg. Co.,  
 Inc. .... 178  
 Shuster, F. B., Co., The. .... 84  
 Simmons Mch. Tool Corp. .... 190  
 Simonds Saw & Steel Co. .... 126  
 Sleeper & Hartley, Inc. .... 84  
 Sly, W. W., Mfg. Co. .... 100  
 Smith, A. O. Corp. .... 14-15  
 Smith, David H., & Sons, Inc. .... 74  
 Smith, F. P., & Co. .... 164  
 Smith, Geo. H., Steel Casting Co. .... 144  
 Smith, H. A., Mchry. Co. .... 192  
 Smith & Mills Co., The. .... 57  
 Smith, Thomas, Co. .... 147  
 Southwark Fdry. & Mch. Co. .... 72  
 Spang, Chalfant & Co., Inc. .... 21  
 Spencer, I. S., Sons, Inc. .... 146  
 Springfield Mfg. Co., The. .... 57  
 Stacey Engineering Co., The. .... 100  
 Standard Appraisal Co. .... 200  
 Standard Electrical Tool Co. .... 57  
 Standard Machinery Co. .... 86  
 Standard Pressed Steel Co. .... 156, 198  
 Stanley Wks., The. .... 197  
 Sterling Grinding Wheel Co. .... 57  
 Stevens, Arthur L., Corp. .... 120  
 Stolper Steel Prods. Corp. .... 200  
 Storms Drop Forging Co. .... 142  
 Stowe-Fuller Refractories Co.,  
 The. .... 137

Streine Tool & Mfg. Co., The. .... 78  
 Strong Steel Fdry. Co. .... 143  
 Strong, Carlisle & Hammond Co.,  
 The. .... 156, 176  
 Sullivan Machry. Co. .... 181  
 Summerill Tubing Co. .... 133  
 Superior Steel Corp. .... 130  
 Surface Combustion Co. .... 174-175  
 Swift Electric Welder Co. .... 78  
 Swindell-Dressler Corp. .... 177

## T

Tannowitz Works, The. .... 66  
 Taylor & Fenn Co., The. .... 57  
 Taylor Forge & Pipe Wks. .... 130, 196  
 Taylor-Hall Welding Corp. .... 193  
 Taylor-Wilson Mfg. Co. .... 106  
 Taylor-Winfield Corp., The. .... 82  
 Tennessee Coal, Iron & Railroad  
 Co. .... 123  
 Thomas Spacing Mach. Co. .... 75  
 Thompson Grinder Co. .... 57  
 Thomson-Gibb Electric Welding  
 Co. .... 82  
 Timken Roller Bearing Co. .... 219  
 Titanium Alloy Mfg. Co. .... 218  
 Titchener, E. H., & Co. .... 167  
 Toledo Machine & Tool Co. .... 67  
 Tomkins-Johnson Co. .... 60  
 Torrington Co. .... 84  
 Traylor Engng. & Mfg. Co. .... 120  
 Treadwell Engineering Co. .... 143  
 Turner & Seymour Mfg. Co. .... 198  
 Twin Disc Clutch Co. .... 107  
 Tyler Tube & Pipe Co. .... 133

## U

Union Drawn Steel Co. .... 125  
 Union Mfg. Co. .... 96  
 Union Steel Casting Co. .... 101  
 Union Switch & Signal Co. .... 141  
 Union Twist Drill Co. .... 60  
 United Engng. & Fdry. Co. .... 34-35  
 U. S. Body & Forging Co., Inc. .... 143  
 Universal Boring Mach. Co. .... 56

## V

V & O Press Co., The. .... 72  
 Valley Mould & Iron Corp. .... 122  
 Vanadium-Alloys Steel Co. .... 11  
 Vanadium Corp. of America. .... 6  
 Vaughn Machinery Co., The. .... 101  
 Veeder-Root, Inc. .... 178  
 Vermilion Malleable Iron Co. .... 146

## W

Wachs-Gregg & Co. .... 192  
 Walsh, J. T. .... 194

Walter-Wallingford & Co. .... 137  
 Wanderman, H. L., Co. .... 130  
 Warner & Swasey Co. .... 44  
 Washburn Wire Co., N. Y. .... 167  
 Waterbury-Farrel Fdry. & Mch.  
 Co. .... 83  
 Watson-Stillman Co. .... 72, 196  
 Webb Wire Works, The. .... 164  
 Weirton Steel Co. .... 128  
 West Leechburg Steel Co. .... 130  
 West Penn Machry. Co. .... 193  
 West Steel Casting Co., The. .... 144  
 Western Screw Products Co. .... 158  
 Western Wire Prods. Co. .... 164  
 Westfield Nut Co. .... 159  
 Westinghouse Traction Brake Co. .... 180  
 Wetherell Bros. Co. .... 126  
 We Want to Buy Section. .... 196  
 Wetmore, James A. .... 200  
 Wheeling Steel Corp. .... 121  
 Wheelock, Lovejoy & Co., Inc. .... 1  
 White, A. D., Machry. Co. .... 193  
 Whitman & Barnes, Inc. .... 7  
 Whitney Mfg. Co., The. .... 106  
 Whiton, D. E., Mach. Co. .... 66  
 Wickwire Bros. .... 167  
 Wickwire Spencer Steel Co. .... 39  
 Wilcox, D., Mfg. Co. .... 142  
 Williams, J. H., & Co. .... 141  
 Wilson-Maeulen Co., Inc. .... 178  
 Wolverine Tube Co. .... 133  
 Wood, R. D., & Co. .... 182  
 Woolford, G. Wood Tank Mfg.  
 Co. .... 118  
 Worcester Pressed Steel Co. .... 197  
 Worcester Stamped Metal Co. .... 150  
 Wright-Hibbard Industrial Elec-  
 tric Truck Co., Inc. .... 96  
 Wrought Washer Mfg. Co. .... 162

## Y

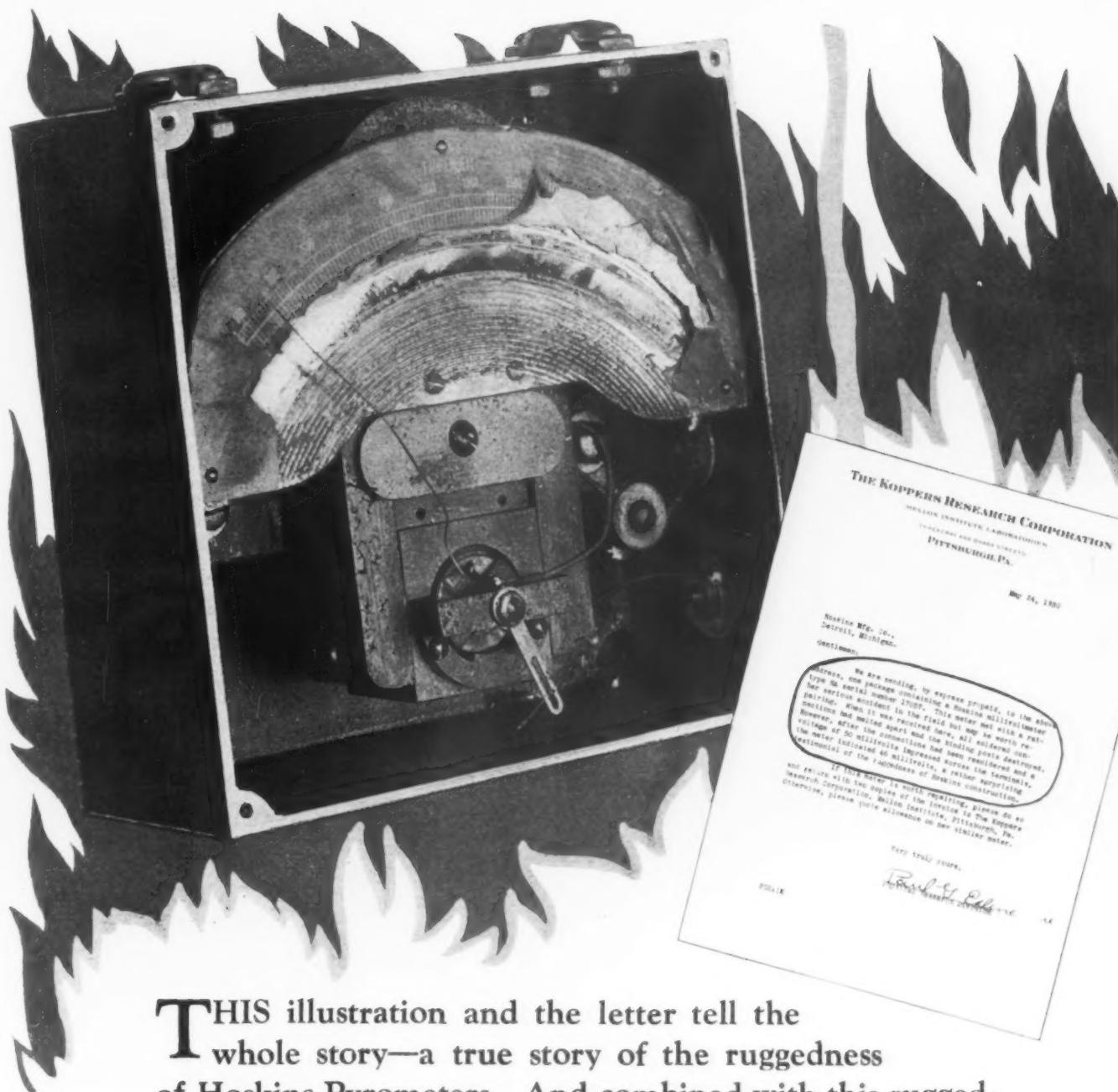
Yoder Co., The. .... 76  
 York Corrugating Co. .... 147  
 York Fdry. & Mch. Co. .... 198  
 Young Bros. Co. .... 177  
 Youngstown Steel Car Corp. .... 198

## Z

Zeh & Hahmann. .... 68  
 Zelnicker in St. Louis. .... 195

## CLASSIFIED SECTIONS

Clearing House ..... 190-195  
 We Want to Buy ..... 196  
 Contract Work ..... 196-199  
 Business Opportunities ..... 199-200  
 Employment Exchange ..... 201-202



THIS illustration and the letter tell the whole story—a true story of the ruggedness of Hoskins Pyrometers. And combined with this ruggedness, is accuracy. Accuracy in the meters themselves, and in the Chromel Couples that operate them. If you are interested in accurate, rugged pyrometer equipment, we invite you to ask for Catalog 52-I.A.

HOSKINS MANUFACTURING COMPANY, 4439 Lawton Avenue, Detroit  
In Canada: Walker Metal Products, Ltd., Walkerville, Ont.

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*Chromel*

Originators and Manufacturers of *Chromel* The most widely used Thermo Couple Alloy



THOSE Steel Makers who are alive to the necessity of producing the highest quality steel are regular users of Ferro Carbon Titanium. Experience has shown them that it can be depended upon to make Good Steel Better.

## The Titanium Alloy Manufacturing Co.

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# And Now—The World's First Anti-Friction Locomotive Timken Bearing Equipped

Another tough job for Timken Bearings—but Timkens are licking it just as they have licked Industry's toughest jobs in all types of machinery!

For the first time in the history of world railroading, a locomotive has been placed on a full anti-friction basis, and Timken is proud to have the privilege of pioneering this great forward step in the interests of American railroad advancement.

The Timken locomotive pictured above was designed and built for the sole purpose of demonstrating the advantages of roller bearings as applied to motive power.

It has been placed in service on a strictly non-revenue basis, and is being loaned without charge to railroad companies desiring to determine its operating characteristics under their own conditions.

Every wheel turns on Timken Tapered Roller Bearings—front truck wheels, driving wheels, trailer truck wheels and tender truck wheels.

There are 32 Timken bearings in the wheels and booster, and in addition Timkens are used in the speed driver of the valve pilot and in the train control governor.

Another revolutionary feature of this locomotive made possible by the higher rotative driving wheel speeds secured through the use of Timken Bearings, is the fact that it can handle fast freight and passenger trains with equal efficiency, having the necessary power and speed for both purposes.

All of the Timken benefits which users of Timken-equipped industrial machinery have enjoyed for years are reflected in the Timken locomotive, namely, friction elimination, lubrication economy, power conservation, radial, thrust and combined load capacity, extended machine life—modern anti-friction necessities that only Timken Bearings can provide. Don't you want these same enduring economies in every piece of equipment you operate? The Timken Roller Bearing Co., Canton, Ohio.

**TIMKEN** *Tapered  
Roller  
BEARINGS*

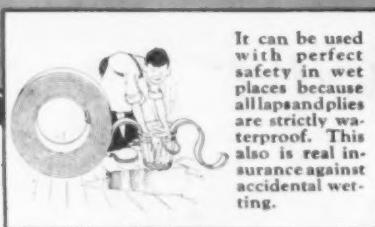
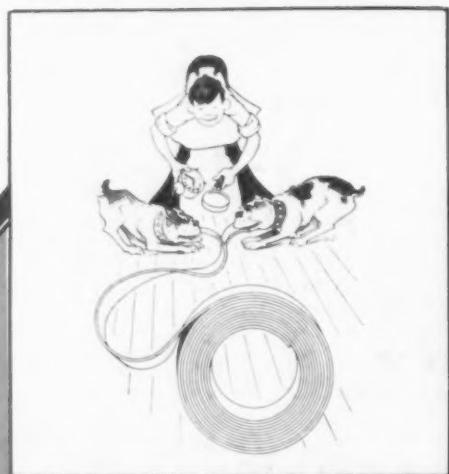
# This NEW LEATHER BELTING

*Has Greater and More Uniform Adhesive Strength*

The constant bending back and forth over the pulleys will not break down the cement. It means a livelier Belt and one that wears longer.



Cement is as Flexible as the Leather Itself



Absolutely

Waterproof



Costs No More

This new and improved Belting costs no more than you formerly paid for our common cemented Belts.

THE laps and plies of the new Graton & Knight Leather Belting are so securely and uniformly cemented that they seem almost to have grown together. This Leather Belting is made by an exclusive process of tension cementing for which a unique type of Belt making machinery (patent applied for) was developed by our own engineers. This modern, scientific process produces Belting that enables you to make real savings because of its many advantages, some of which are: its greater and more uniform adhesion in laps and plies—its greater flexibility—its waterproof qualities—and the fact that it costs you no more than you formerly paid for our common cemented Belting.

Belting users make a substantial reduction in maintenance, operating and production costs by using the new Graton & Knight Leather Belting.

All Belting users are invited to visit our plant at Worcester, Mass., and see in operation the amazing new type of Belt making machinery which is producing this new Leather Belting.

#### OTHER INDUSTRIAL PRODUCTS

Rubber Transmission, Conveyor  
and Elevator Belting  
Mechanical Rubber Goods  
Lace Leather

Round Belting  
Belt Cements and Dressings  
Leather Link "V" Belting  
Leather Cups

"U" and Flange Packings  
Leather and Rubber Washers  
and Discs  
Hand Leathers

## Graton & Knight Company

Worcester, Mass.



# This Issue in Brief

**Antagonism on the part of workers toward the introduction of an apprentice-training system can be overcome by forming a committee composed of production executives. The workers have confidence in their superiors and in this way prejudice can be dispelled.**—Page 979.

\* \* \*

**Money can be saved for the steel industry by charging open-hearth slag into the blast furnace rather than throwing it away. The iron it contains, and especially the manganese, give it considerable value.**—Page 980.

\* \* \*

**Power press crankshaft must be strong, as it is the heart of the press. But it must not be too strong, otherwise it presents the possibility of a broken frame.**—Page 982.

\* \* \*

**Harmful gas can be removed from molten aluminum alloys by treating with titanium tetrachloride. Grain size is markedly reduced. The best way to introduce the chloride is to saturate dry asbestos wool and place at the bottom of the melt.**—Page 985.

\* \* \*

**If you want your wire rope to have long life see that it is uncoiled properly. Mount the reel on jacks and pull the rope off as the reel revolves. If coiled, roll the coil along the floor. Never lay the reel or coil on the floor and pull the rope over the side.**—Page 986.

\* \* \*

**If you have a plant improvement idea, fight for it. Many sound schemes die because their proponents are too modest, afraid of their superiors, or too easily discouraged.**—Page 989.

\* \* \*

**Slight growth during nitriding can be allowed for in final machining or grinding before nitriding. Or it can be removed afterward by lapping.**—Page 991.

**When you have electric motor trouble, first determine whether the motor has the proper characteristics for its work. If trouble is still unfound, investigate the driven load, to ascertain if erratic conditions exist.**—Page 988.

\* \* \*

**Produces cylindrical castings of non-porous metal, uniform texture and hardness, close grained and free from imperfections, in centrifugal casting machine. Navy Yard makes both ferrous and non-ferrous castings. Steel cylinder is lined with sand. Molten metal is poured in through a spout.**—Page 994.

\* \* \*

**Win sales arguments by doing more listening than talking, professor tells industrial salesmen. Make your points briefly. Look thoughtful, give objections careful consideration. Don't interrupt the prospect.**—Page 997.

\* \* \*

**Relieves foremen of responsibility of selecting work to be put on a machine by means of production control system. Heart of the system is four control wheels, each with 52 pockets, one pocket for each machine. Card in the pocket tells what the machine is working on.**—Page 1002.

\* \* \*

**How long will the business recession last? A study of seven recessions and recoveries in steel production reveals that the present recession is the least severe. Average length of recovery was about 15 months, which would make recovery from the present lull come next March.**—Page 1009.

\* \* \*

**Ruin of many an ambitious employee training plan is due to failure to appreciate that it is harder to maintain a training plan than to start one. Interest lags when novelty wears off. Interest can be stimulated by carefully planned meetings.**—Page 1045.

**Better steel results from presence of manganese in the pig iron. Manganese in the blast furnace charge permits desulphurizing and increases fluidity. "Bull-dog" silica inclusions are absent.**—Page 981.

\* \* \*

**To calculate the pressure in tons exerted by a single-crank press, multiply the square of the crankshaft diameter by 3½. This rule is approximately correct except where the stroke of the crankshaft exceeds twice its diameter.**—Page 982.

\* \* \*

**Unsoundness and blow-holes result from melting light aluminum alloys in a gas-fired furnace, says British metallurgist. But treatment with volatile chlorides removes imperfections.**—Page 985.

\* \* \*

**Normal operation of your electrical apparatus may be aided by use of synchronous motors at key points. Now non-stalling on undervoltage; adaptable for low-speed drives.**—Page 989.

\* \* \*

**Before nitriding, be sure to heat treat, to obtain desirable physical properties of the core and to insure proper grain refinement.**—Page 991.

\* \* \*

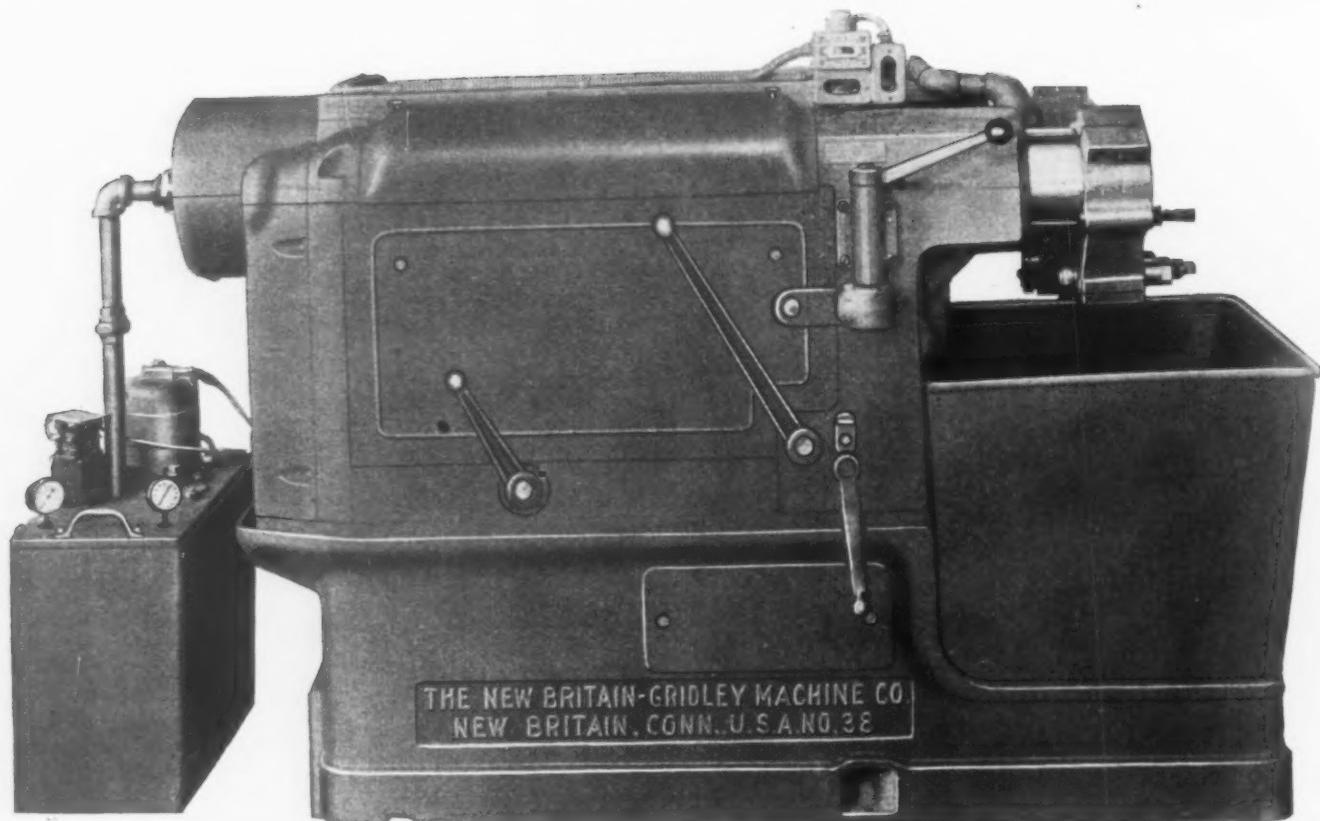
**High temperatures decrease nitriding hardness although depth of case increases. For deep case, you can nitride at 1200 deg. F., and again at 950 deg. F. for desired surface hardness.**—Page 991.

\* \* \*

**Deep drawing dies can be nitrided, but sharp corners must be avoided if good results are to be obtained. Design of the die has much to do with the success of the treatment.**—Page 992.

\* \* \*

**Uniform nitriding results are obtained by packing the work in magnesia, copper and chips. Type of case obtained is independent of the dissociation of the gas.**—Page 993.



## NUMBER 38 NEW BRITAIN SINGLE SPINDLE CHUCKING MACHINE

An extremely rigid compact single spindle chucking machine designed to permit both longitudinal and radial cuts with each of the two tool slides regularly furnished.

Massive construction and exceptional supporting qualities of tool slides and tool carrying arms allow conventional feeds to be easily exceeded, without sacrifice to quality of work or satisfactory tool life.

Work is gripped quickly and powerfully, yet without distortion, through patented hydraulically operated chucking unit. 10½" chucks, either internal or external, or special fixtures may be used.

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NEW BRITAIN, CONN.**

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